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# Release Notes

## Political PC Passion

The other day a reader sent me a protest e-mail, calling for an end to political discussion in game reviews and editorial columns, and a quick termination to our Patriotic PC Case Modding contest. The magazine, he argued, should focus its full attention on issues PC-related.

I see his point, but don't agree. If you're a faithful reader of *Maximum PC,* computing is an extremely important part of your life. But I also think that the various important parts of a PC enthusiast's life don't exist in individual, hermetically sealed vacuums. PCs are connected to other issues, if only slightly so, and our magazine would be diminished if we didn't take a bigger-picture view every so often.

*Maximum PC* might be "just" a computer rag, but it's also most of our regular readers' favorite magazine, and some of our readers' only exposure to print media. As such, we serve as both town crier and as a vehicle for people to share ideas. We write articles, you respond. And then other readers respond to your responses, and the dialogue continues thus. As PC geeks first and foremost, we—readers and editors—want to talk computers. But we also have thoughts on cars, *Star Trek*, and, yes, politics. For this reason, we think it's OK for small amounts of non-computer commentary to appear in the magazine.

Years from now, the publications of 2003 will be judged by whether they had opinions on topics of the day. Did they cede the basic American right to contribute to debate, or did they join the debate? I believe the tenor of our times can and should be reflected in all publications, and not just straight news sources. A magazine as grounded in populism as *Maximum PC* would be remiss if it ignored the world around it.

*Maximum PC* is neither dovish, nor hawkish, nor leftist, nor rightist. But, as evidenced by our candid product reviews and frank language, we do stand for free speech—and this is the "political stance" that we unapologetically support. All of which leads us to our Patriotic PC Case Modding contest. The purpose of the competition is to promote perhaps the best thing America has going for it: the right to express oneself in any manner whatsoever, without fear of reprisal. So what better way to exercise your right than to mod a case that illustrates your own interpretation of the American spirit?

I expect to see a lot of contest entries bearing stars and stripes. But, it would also warm my heart to see some thought-provoking, and even critical, commentary as well. If we aren't fighting the good fight to protect citizen flag-burners in all their irrational, misguided zealousness, then what are we doing?

**—JON PHILLIPS**

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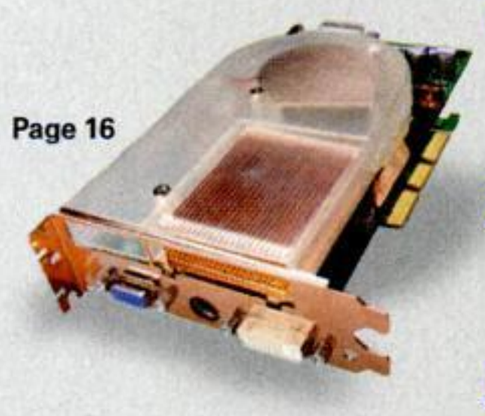

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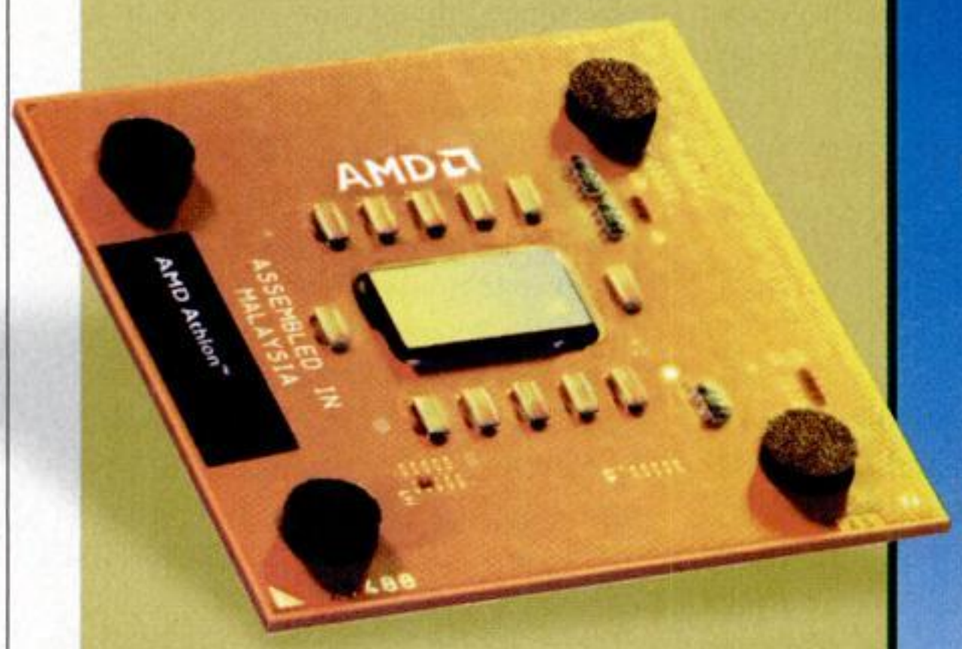
# APRIL FEATURES

## 24 Best Budget Buys

Take notes as our team of experts walks you through an entire PC, part-by-part, showing you the best values. Yes, you can have great performance for less!

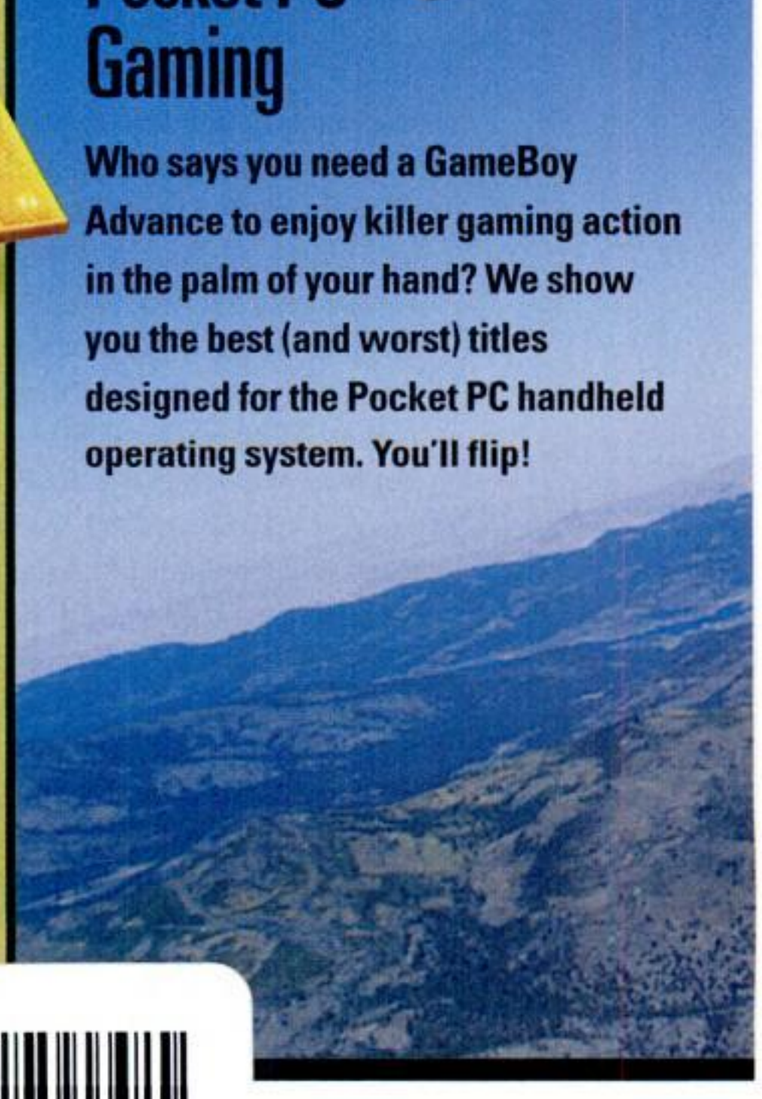



## 36 Barton Rising

**Last month we showed you AMD's new contender for the desktop CPU throne. This month we give you the full scoop on Barton Athlon XP upgrading.**

## 46 Pocket PC Gaming

**Who says you need a GameBoy Advance to enjoy killer gaming action in the palm of your hand? We show you the best (and worst) titles designed for the Pocket PC handheld operating system. You'll flip!**



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# In/Out

**You write, we respond**

**LETTERS POLICY:** ***MAXIMUM PC*** invites your thoughts and comments. Send them to **input@maximumpc.com**. Please include your full name, town, and telephone number, and limit your letter to 300 words. Letters may be edited for space and clarity. Due to the vast amount of e-mail we receive, we cannot personally respond to each letter.

## AMD VS. INTEL: NOT SO FAST...

Your March "Speed Trials" article was informative, but I have to take issue with your declaration that neither Intel nor AMD have a decisive lead with their top-end processors. Besides the fact that I can order a Pentium 4 3.06GHz and get it delivered the next day, but can't beg, borrow, or steal an Athlon XP 3000+, your own benchmark numbers show that the Athlon fails to make the grade.

The Athlon beat the P4 in just five of 15 tests. Of those five, the *3DMark2001* benchmark was effectively a tie; the 0.3 percent variation is typical of consecutive runs of *3DMark2001*. In fact, the Athlon's only impressive showing was in *Premiere*.

Yes, Elizabeth is distracting... Where was I? Ah, yes. By your own numbers, the Pentium 4 3.06GHz takes the cup.

**—CRAIG PUTNAM**

**SENIOR EDITOR GORDON MAH UNG REPLIES: There were 15 benchmark results listed, but keep in mind that four of the scores were for *SiSoft Sandra* (a synthetic benchmark suite), and two were sub-scores of *SYSmark2003*. We run *SiSoft Sandra 2003* because it offers some insight into memory-bandwidth performance, but it still isn't a real-world CPU benchmark, and even Intel has said the *SiSoft* Dhrystone and Whetstone tests aren't very relevant anymore. The upshot is that *SiSoft* results didn't weigh much on our final evaluation of the CPU battle.**

**As for *SYSmark2002*, we didn't chalk up three wins for Intel, but rather just one win for having the best overall score in this test. We simply reported sub-scores to give readers as much info as possible. Now, indeed, the P4 did trounce the Athlon XP in *SYSmark2002* overall, but what's more important to readers: office and web creation apps or *Photoshop*, *Premiere*, *Quake III*, and *MusicMatch*? We stand by our decision, but now think we could've explained our analysis better.**

***"How much money are they paying Maximum PC to see that they claim all victory in this category?"***

## YOU CRIPPLED THE ATHLON!

I find your comparison of the Athlon XP 3000+ and the P4 3.06GHz a bit awry. If you're going to use the fastest available RAM for your Intel system, why not use the fastest available RAM for your Athlon rig? With DDR400 available and widely supported by the newest chipsets, I find it a bit unfair to use DDR333 when testing against PC1066 memory.

**—CHRIS THAYER**

**SENIOR EDITOR GORDON MAH UNG REPLIES: Most CPUs perform best when their frontside buses and RAM are running at the same speed. If you were to run the Athlon XP with a 333MHz frontside bus and 400MHz DDR, the performance would be worse than running it at 333MHz/333MHz. For the record, we used Corsair DDR RAM rated to run in excess of 400MHz; we just had it clocked at 333MHz with CL2. I'm sure Intel would have liked for us to run it at 400MHz, but AMD would likely have been miffed.**

## SMELLS LIKE ROTTEN APPLES

May I please have permission to reproduce a paragraph from your March issue "Speed Trials" story? I'd love to photocopy it or scan it, and then have it enlarged on 36-inch engineering paper to hang in my office. It's the paragraph that reads, "We came to one conclusion very quickly after reviewing the numbers: Mac people who scream that their Apples are faster than PCs are simply so full of crap, they could double as septic tanks." I love that statement.

**—BOBBY IRVIN**

**EDITOR-IN-CHIEF JON PHILLIPS REPLIES: Permission granted.**

## EVEN OEMS HAVE THEIR PLACE

I just finished reading the letters section of the March 2003 mag. What is it with this OEM bashing? If building your own state-of-the-art PC is what you want to do, then go for it. But don't criticize what the OEMs are building.

Just recently, I bought an OEM Presario 6000 from one of the warehouses. I got an FIC AM37 motherboard, an Athlon XP 2000+ proc, a stick of Kingston 256MB DDR, a 30GB Western Digital hard drive, CDRW, DVD, Compaq 7500 monitor, JBL speakers, WinXP, and a one-year warranty for $525! Sure, the onboard video sucks, but I just ordered an ATI Radeon 9000 Pro 64MB. This system is awesome for my needs. I'm not going to get fantastic frame rates in most games, but I have a great return on investment.

I understand customizing. I'm the proud owner of a '76 Land Cruiser FJ40 4x4, which I have been building for a few years. When I see people out on the trail in their brand-new SUVs, I don't bash them. I just give them a wave and show them what a real 4x4 can do. Can these SUVs go the places I go? Probably not. Can they go out and have some fun four-wheeling, nonetheless? Absolutely. And I'm glad that there are only a select few of us customizers on the trail.

I felt there should be a perspective from the other side.

**—JOHN CRUTCHFIELD**

## WE PLEXTOR ALLEGIANCE TO THE...

I notice that no one to my recollection has ever dethroned Plextor in the CD-RW drive category in your "Best of the Best"listings. How much money are they paying *Maximum PC* to see that they claim all victory in this category? Lite-on makes some mean drives, and has been leading Plextor in speed for quite some time. I understand Plextor may have a better-built drive, and it may also handle audio better, but Lite-On is less expensive, has excellent burning qualities for many data disk types, and simply hauls ass. I think you need to start looking at more than just Plextor, but then again, the cash flow would cease, I am sure.

**—G. SAVANT**

**FEATURES EDITOR LOGAN DECKER REPLIES: Well, you pretty much answered this challenge yourself. Plextor has built the better overall drives, and we believe the Plexies do handle audio better. In fact, we still prefer the PlexWriter 48x over drives from TDK and Asus with higher performance ratings.**



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**The current Plextor has the absolute lowest access times of any optical drive we've ever tested, and on a day-to-day basis, that means more to us than shaving a few seconds off a disc burn (and you'll only save those few seconds when you're completely packing a CD).**

**We haven't yet received Lite-On's 52x, but we doubt its speed gains for average disc burns will be appreciably faster than Plextor's 48x, or that disc access times will have plunged significantly. For the record, pricing doesn't have much influence on our verdict ratings or Best of the Best rankings, and in fact, the Lite-On 32x did hold the title of Best of the Best for a while (during that same period, the PlexWriter 40x got a relatively disappointing verdict of 8). Also, a budget Lite-On drive gets the nod in this month's cover story.**

**We hate answering a question with another question, but what the hell: How much has Lite-On been paying *you*?**

## SURVEY SAYS: BAD ANALYSIS

I just read "Survey Says..." in the March issue. The gross error in your conclusions—that "the average gamer's hardware configuration wouldn't rate a 4" and that the "survey reflects the hardware habits of the general gaming community"—literally jumped off the page at me.

Since the *FutureMark* data was collected for those who went to a web page or downloaded a benchmark, an accurate statement would be, "The survey reflects the hardware habits of the general benchmarking community." The sample set is entirely composed of people who ran a benchmark. They may not even be gamers for all *FutureMark* knows.

This begs the question, What type of gamer runs a benchmark? I think of two extremes of the economic scale: the "underprivileged" gamer whose budget forces him to squeeze every pixel out of his aging GeForce2, and the "cash is not a factor" gamer who runs the benchmark on his Radeon 9700 Pro just to post the results on newsgroups.

I would suspect a large percentage of the gaming community does "common sense" upgrades like I do: upgrading to a point of satisfaction, and not giving a dang about benchmarks.

**—CHRISTOPHER C. DONDANVILLE**

## OH, YOU'RE GOOD. YOU'RE GOOOOD.

I've been modding computers for a while now, and while I don't have a rig ready to submit to your contest yet, I would like to make a suggestion. I love seeing those rigs on the back page, but instead of calling the department "Rig of the Month," why not consider "Best CASE Scenario"?

**—TIM HENDERSON**

**EDITOR-IN-CHIEF JON PHILLIPS REPLIES: Capital idea! Unfortunately, that name is already taken. Go check out the gear at www.thebestcasescenario.com.**

## DON'T STOP KICKIN' ASS

If I want numerical rankings or star-ratings, I can read any other publication. But if I want to know where to spend my hard-earned money, I just look for the Kick Ass seal on your reviews. To all the people that can't stand to read language that's milder than what can be heard on the radio or TV, What exactly do they think the "BS" on the cover stands for?

**—JASON MILES**

My schoolgirl-like giddiness for your publication does not stem from acute nerdiness. I don't need to memorize benchmarks, and read *just one more time* about the latest videocard. If I need a fix of computer info that badly, I can just log onto any one of kajillion web sites!

No, I don't savor each issue of *Maximum PC* like the last bite of dessert for its mere ingredients. It's the flavor—the style—the incredible wit and charm you guys mix into every issue that brings a tear to my eye as I read the final words of "Rig of the Month" and realize my ice cream is all finished!

The sarcasm and tell-it-like-it-is attitude has me smiling from cover to cover. I remember the first time I picked up an issue and saw that you awarded products "Kick Ass" status. This was my kind of magazine, and I praised the Lord that someone knew how to talk about computers and be entertaining, all at the same time. PCs meet *National Lampoon*? Bring it on!

So it was with absolute shock that, in the last issue, Jon Phillips revealed that *Maximum PC* would be "toning down" its "language" due to the whining protests scribbled on some reader response cards. Sure enough, nowhere in the issue was there a single "Kick Ass" award!

Are you guys freakin' kidding me? You guys have the greatest magazine of any kind on the stands right now, and it's that sass and wit that has gotten you what must be the most loyal readership in PC land. We love you because of who you are, and the thought of any self-censorship churns my stomach. If *Maximum PC* slaps a muzzle on itself and takes the bite out of PC reporting, we all might as well slap on some Borg outfits and start reading *Computer Shopper*.

**—MOJO**

**EDITOR-IN-CHIEF JON PHILLIPS REPLIES: Our subtle shift to cleaner language has nothing to do with the fact that no products received the Kick Ass award last month. In fact, we felt no products deserved the award last month. This was a first for *Maximum PC*. In all previous issues, at least one product has squeaked by into the land of keister-kicking. Thanks go out to all the readers who noticed our particularly judicious month of product criticism.**

## WALKEN THE WALK

I found your March issue article on post codes ("Don't Fear the Beeper") to be informative, but lacking in one thing. It needs more cowbell.

**—STU PIDASO**

# COMING NEXT MONTH

## IN THE DOES-A-BODY-GOOD MAY ISSUE OF MAXIMUM PC

### PC BOOT CAMP...

**A Full Training Regimen for Your Flabby PC**

Whether you buy a new computer from an established manufacturer, or build it yourself on your dining room table, it's still nothing more than a raw recruit. *A freshly uncrated or configured PC still needs much work to reach fighting shape.*

Next month, we show you our favorite power-user tips for making "green" PCs better, stronger, and faster!

And don't fret if your PC isn't still gleaming new. Our advice can help all inexperienced soldiers.

**Also...**

- State of the Motherboard Union Address
- Our 20 Favorite Case Modding Accessories
- First look at WD's 10,000rpm desktop drive



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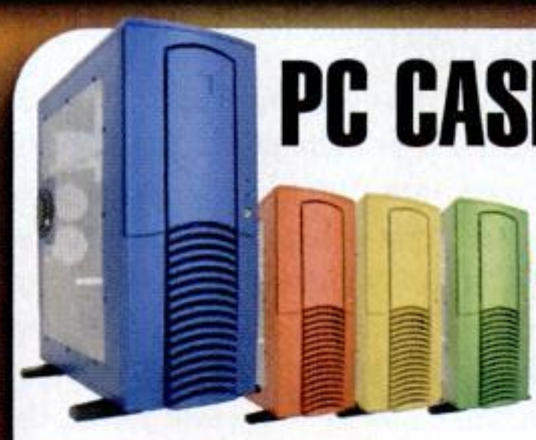

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| P261-1800 | PcToys 18" ATA Round Cable (Choose Color) | $12.99 |
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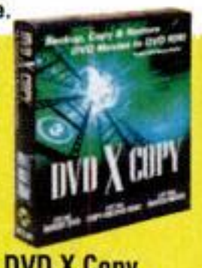


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# Quick Start

**The beginning of the magazine, where articles are small**

## The Future of Portable Storage

Three drives, two companies, and one big fat reservation

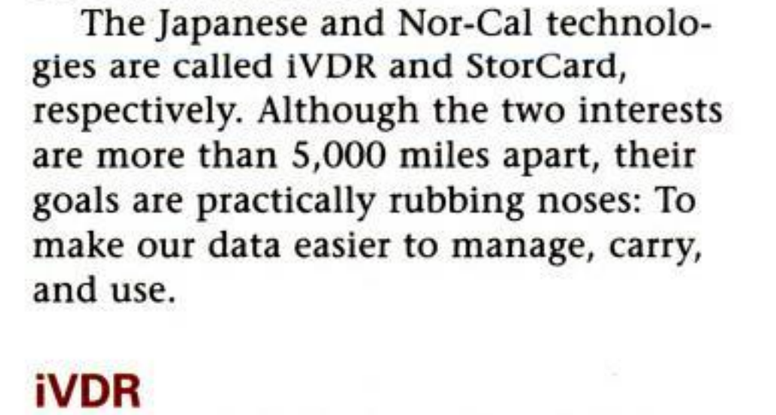
If PCs are to truly converge with consumer electronics devices, we'll all need much more convenient ways to carry around mass amounts of data. Enter a Tokyo-based consortium of Japanese heavyweights that's putting the finishing touches on prototypes of three tiny external hard drives. The group—which includes Fujitsu, Pioneer, Sanyo, and Sharp—sees these drives as the portable storage media that will bridge the gap between PC geeks and regular-old, gadget-loving civilians.

Meanwhile, in San Jose, California, another type of portable storage has been developed, and it's in the shape of everyone's favorite piece of plastic—the credit card. The company is led by Finis Conner, one of the founders of Seagate Technology. Nearly 25 years ago, Conner oversaw the manufacture of the first 5.25-inch hard drive.

The Japanese and Nor-Cal technologies are called iVDR and StorCard, respectively. Although the two interests are more than 5,000 miles apart, their goals are practically rubbing noses: To make our data easier to manage, carry, and use.

### iVDR

iVDR stands for Information Versatile Disk for Removable usage, which the Japanese consortium calls "a lightweight, compact removable hard disk drive compatible with a wide range of applications from AV to PC devices." Two types of iVDR disks are being developed: a 2.5-inch disk with a parallel ATA interface, and 2.5- and 1.8-inch drives using Serial ATA. The 2.5-inch drive pictured here holds 80GB, a capacity that is expected to *double* by the time the drive is introduced later this year.



**The name sounds like a venereal disease. Will using the iVDR drive feel like one?**

The iVDR consortium has a lot more than just your next PC hard drive in mind. The group intends iVDR to be a common platform for all types of devices. For example, an iVDR cartridge would go from your Serial ATA PC, to a Serial ATA-enabled television, to a personal video recorder, to a car stereo. It would go anywhere mass storage is needed.

It's a fine idea, but there's a dark cloud on the iVDR horizon. A press release dated March 2002 proudly states that the consortium will "look into the important area of 'content protection security technology.'" An organizational chart on the consortium's web site (**www.ivdr.org**) also specifies a "Secure WG"—a working group dedicated to creating a "content security specification." No one wants to talk about this part. In fact, no one's really ready to talk about iVDR at all. Maxtor and Seagate, freshmen in the consortium, would only confirm their membership.

There's not yet any clear indication as to what extent DRM (digital rights management) will be implemented on the devices, but we think few people will go ga-ga over a format that denies the free, unfettered exchange of data. Hopefully, the consortium is listening.

### StorCard

The 3.5-inch floppy drive took yet another body blow when Dell announced in February that it would no longer include the wee vestigial component in new PCs by default. But while the 1.44MB format may be incredibly antiquated, the technology behind it is still valid. And there's no better example of that than the StorCard, a credit card-size disk that can store from 100MB to 5GB, is cheap to produce, and contains onboard, real-time encryption.

If you've ever pried apart a floppy disk, you'll recognize the structure of the StorCard. The magnetic media inside is an extremely thin, mylar-based disk. (Mylar is the same material used in those silver party balloons that cause power outages when they hit electrical lines.) The StorCard disk rotates at 3600rpm, and has an astonishing transfer rate of 5MB/s. An embedded chip acts as an onboard controller and also encrypts and decrypts data on the fly.

**In a construction similar to ye olde floppy, the StorCard's mylar-based media is protected by an upper and lower liner, and is read through the shutter on the bottom of the card.**

When we asked Greg Goelz, VP of marketing for StorCard, about including DRM in the StorCard controller, he said, "We are working with the major DRM suppliers to extend their solutions to the card... This binds the rights management with the content for portability."

The short answer is "yes," StorCard will play Big Brother. But we're not as apprehensive about the specter of DRM applied to StorCard as we are about what might happen to iVDR. After all, medical and financial data are natural applications for the StorCard, so built-in encryption and digital management makes sense.



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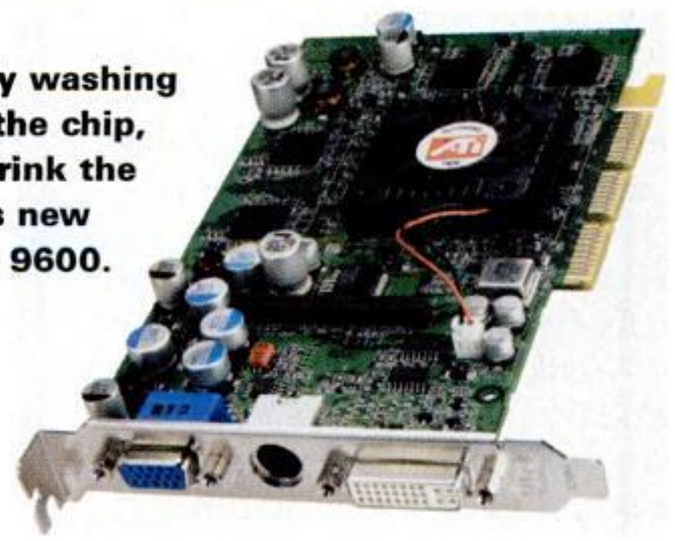
# ATI's Spring Lineup

The first 0.13-micron ATI card isn't the Radeon 9800!

This spring, ATI launched its answer to the GeForce FX—check out our exclusive details on page 16. But amid all the hoopla surrounding the top-shelf card, ATI also slipped through its first 0.13-micron part. The Radeon 9600, a new midrange offering, uses a die-shrunk version of the R300 core that powered the Radeon 9700. Thanks to the die shrink, ATI has even been able to run some test boards without external power or active cooling—quite a feat. The 9600 Pro will include 128MB of DDR memory, four pixel pipelines, and up to 128MB of memory.

The 9600 Pro should be available for about $170 in mid-April, with a core clock speed of 325MHz, and 325MHz to 350MHz for memory (final memory clocks haven't been determined yet). A slower-clocked version of the offering should be available at about the same time for around $150.

We haven't yet acquired a 9600 board for in-house testing, but we'll be sure to give you the full scoop as soon as it arrives.



**Perhaps by repeatedly washing and tumble-drying the chip, ATI managed to shrink the R300 core on its new midrange Radeon 9600.**

## FUN-SIZE RUSE

For any number of factors, some worthy news items never make it into the magazine. Here's a sampling of the scoops that didn't make the cut, and why.

### Too Risqué

**82% of Female Gamers Prefer Sam Fisher's Ass over Solid Snake's**

Hideo Kojima, developer of the console Metal Gear series, concedes, "We had a naked guy, but no split jump."

### Overtly Political

**Bush Declares War on Middle Earth**

"We have to help," President says. Powell uncertain how to attack fictional enemy.

### Story Was a Load of Bull

**Anti-Piracy Measure a Success; WinXP Price Dramatically Reduced!**

Microsoft issues brief press release: "Well, that's what we said would happen, isn't it?"

### Not PC-centric Enough

**Woman Helps Nigerian Émigré, Earns Millions**

"I didn't do it for the money," says good Samaritan.

### Cancelled Launches

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# The MaGIC of Gibson's Digital Guitar

A new audio protocol could transform all multimedia connections

More than 20 years ago, musicians saw the birth of MIDI, a digital transmission protocol that allows electronic instruments to send messages to each other, sync themselves up, and even control one another. The system works so well, it's still used today in nearly the same form as when it was originally introduced—a technological rarity if ever there was one.

Now, Gibson Guitar (**www.gibson.com**) has introduced a communications protocol called MaGIC that may have an equally revolutionary effect on how stringed instruments are recorded. What's more, the new protocol—developed in partnership with 3Com, AMD, and Xilinx—could eventually change how all audio and video consumer electronics connect to PCs, and to each other.

The first device to use MaGIC (the acronym for Media-accelerated Global Information Carrier) will be, not surprisingly, the Gibson Digital Guitar. The guitar has a special pickup that digitizes the sound of each of the guitar's six strings individually. This allows different effects to be applied to different strings, and by moving digitization into the guitar itself, latency problems associated with PC-based digital processing and recording are eliminated.

After digitization, the guitar's built-in Ethernet port uses the MaGIC protocol to transmit signals over standard CAT-5 cabling. Each cable is capable of carrying up to 64 channels of 32-bit, 48KHz uncompressed digital sound (32 channels in each direction). Gibson Chairman Henry Juszkiewicz says MaGIC will "replace a variety of different ways of accessing audio and video information with one connector and a system which instantly configures itself... Like the guitar, you plug it in, and it works."

The upshot is that MaGIC technology—which will be free of licensing fees for 10 years to encourage adoption—could conceivably sweep away the nasty nest of RCA, component, and optical connectors that accumulate behind today's entertainment centers. Instead, you'd merely be concerned with a single Ethernet jack. Still, don't toss your patch cords quite yet, because Gibson's guitar won't debut until later this year. If you want the excruciating details, you can get more information at **www.gibsonmagic.com.**

**The guitar is the network: A guitar with an Ethernet jack may be the first you'll see of a new standard for connecting audio and video consumer electronics.**

## FAST FORWARD

BY TOM R. HALFHILL

# Can IBM Save AMD?

**AMD's new alliance with IBM to jointly develop chip-fabrication technology could make a huge difference in AMD's ability to keep up with Intel. But their new technology won't enter production until 2005 at the earliest, and that might not be soon enough to save AMD from suffering major pain.**

**Racked by losses, AMD is slashing budgets and canning thousands of employees. It's not a good situation for a company that must invest billions of dollars to match Intel's massive investments in new fabs. That's why AMD wisely joined forces with IBM, arguably the world leader in fabrication technology. AMD engineers have already moved to IBM's new 300mm-wafer fab in Fishkill, New York, to work on future 65-nanometer (nm) and 45nm chip-making processes.**

**To put that in perspective, AMD and Intel manufacture today's chips in 130nm processes, commonly known as 0.13 microns. (Lately, engineers are converting microns to nanometers, eliminating the pesky decimal point and zeroes.) This summer, Intel will begin shifting production to the next-gen 90nm process, followed shortly by AMD.**

**AMD's saviors were supposed to be the 64-bit Opteron server processors and Athlon 64 desktop processors, which would trump Intel's 32-bit CPUs. Both were scheduled to debut early this year. But only Opteron will appear before summer, because AMD is having production problems. One snag involves the new silicon-on-insulator (SOI) transistors, which boost clock speeds. Poor yields have forced AMD to introduce the lower-volume Opteron first and postpone the higher-volume Athlon 64 until September. (Intel has been leery of SOI and is holding off until 2005.)**

**SOI is old hat to IBM, which has been making SOI PowerPC chips since 1999. It would seem that AMD's snug-a-bug with IBM would bring some much needed help with SOI. But their deal covers only the 65nm and 45nm processes, scheduled to debut in 2005 and 2007, respectively. It doesn't even include 90nm, which is the next step beyond 130nm, the process currently troubling AMD. Unless the two companies revise their agreement, AMD is on its own. (A previous alliance with Motorola has expired.)**

**Delaying Athlon 64 will hurt AMD. To plug the gap, the new Athlon XP 3000+ and upcoming 3200+ try to beat Intel's fastest Pentium 4 chips. But the Barton-core 3000+ actually has a lower clock speed (2.16GHz) than the Thoroughbred-core Athlon XP 2800+ (2.25GHz). Barton relies on a larger L2 cache (512K vs. 256K) to justify its 3000+ model number. As Intel's clock speeds soar beyond 3GHz, AMD needs the glamour of 64-bit processing to lure buyers—especially since any lightning from the IBM deal is probably two years away.**

*Tom Halfhill was formerly a senior editor for* Byte *magazine and an analyst for* Microprocessor Report. *He is now a technical writer/analyst in Silicon Valley.*

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# Let's Fix PC Gaming!

Microsoft's top gaming honcho gives us a preview of DirectX 10

Console game systems will never, ever be able to match the graphics capabilities of PCs. But we sometimes pay a heavy price for our cutting-edge graphics and humongous resolutions. We're used to a lot of quirks and hassles—nap-length installation times, constant driver updates, game patches, and so forth. But the future might be a bit brighter if Dean Lester has his way. Lester, general manager of Graphics and Gaming Technologies for Microsoft, explained how the next iteration of Microsoft's DirectX aims to combine the graphics power of the PC with the ease of use of a dedicated gaming console.

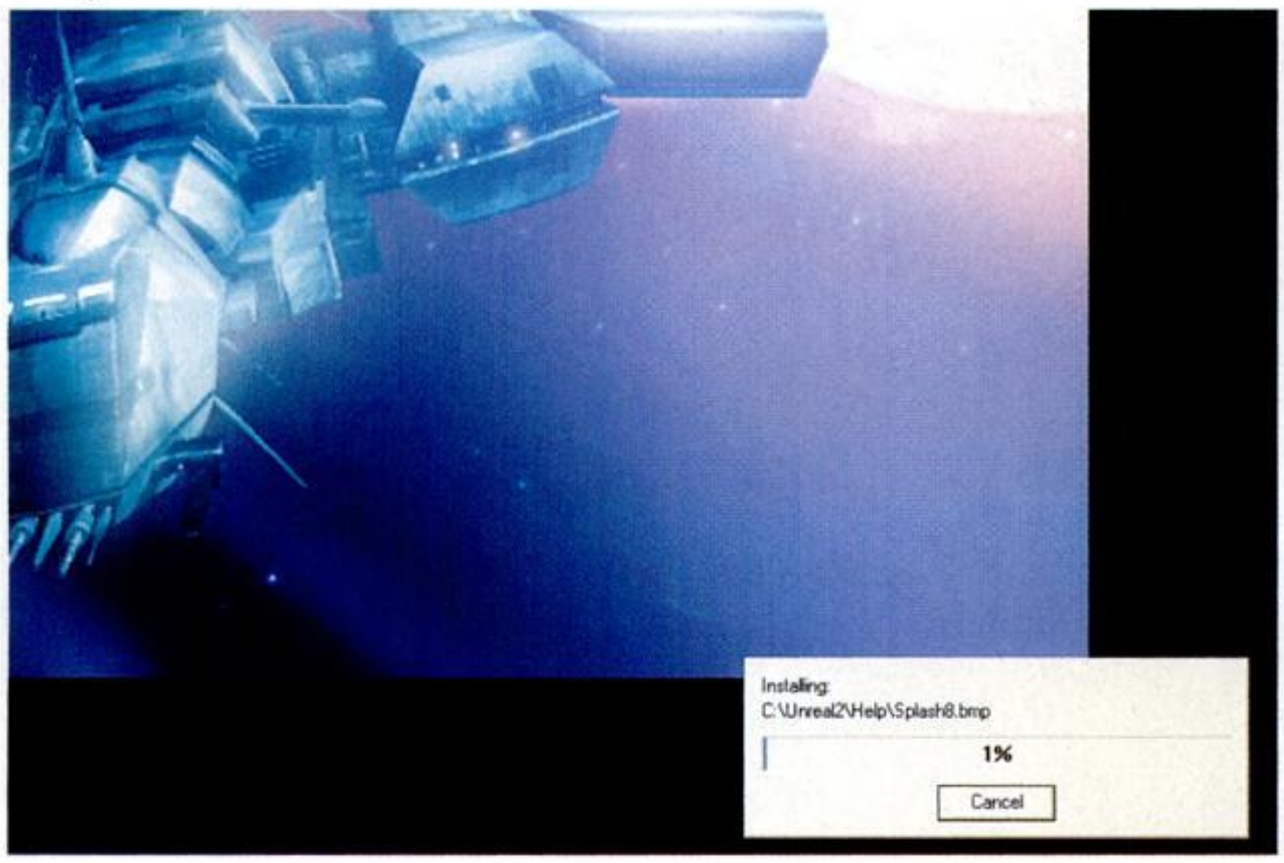
Expect to see DirectX 10 ship with the next version of Windows (code-named Longhorn) in the second half of 2004. Not all the changes Lester mentioned will necessarily make their way into DirectX 10, and many of them are definitely geared toward the newbies (Microsoft wants DirectX 10 to improve the entire PC gaming experience for everyone). Here's a preview of what the future gaming API will have to offer.

➤ Faster installation and launching: Installing PC games is a drag, especially when you compare the process with popping a CD into a console tray, and playing your game 20 seconds later. Microsoft believes it can eliminate most of the tedium of installing and launching games by placing key files in areas that can be quickly accessed on the hard drive. This is unlikely to affect power users, however, as most of us do full hard drive installs of all game assets.

➤ Centralized save-game folder: Microsoft is going to include a gaming folder using the same model as My Documents and My Pictures. This folder will be the "gaming hub" on your PC, and will include all your saved games, as well as game configuration settings. (Five bucks says it's named My Games.)

➤ Game support through Windows Update: Nobody should have to wait until his systems crashes and his progress is lost before finding out that a patch for the game was made available last week. To solve this problem, Windows Update will let you know when there are game updates available for all your games, and offer an option for automatic download.

➤ Friendly fire: Microsoft plans to integrate its Instant Messenger with the games folder, so that you can see which of your IM buddies have a certain game, and invite them to play, all within a single interface.




**Are we having fun yet? Too often, installation screens are the first exciting 10 minutes of the PC gaming experience. Will DirectX 10 change all that?**

## GAME THEORY

BY THOMAS L. McDONALD

# Garry's End Game

Following the draw (3-3) of world chess champion Vladimir Kramnik in his matches against the computer Deep Fritz, yet another man-vs.-machine matchup splashed big in the mainstream media this February. This time, grandmaster Garry Kasparov took on *Deep Junior*, a modified version of an off-the-shelf chess engine running on four 1.9GHz Pentium 4 processors. (Impressively, the machine never needed to be rebooted.)

The six games were billed as a long-delayed grudge match, with Kasparov trying to make up for his humiliating defeat at the hands of IBM's Deep Blue in 1997. But casting it this way wasn't quite fair. Deep Blue was a monstrous multi-million dollar machine using brute force to solve chess problems by rapidly searching all potential lines of play for the best moves. *Deep Junior* is simply a very good chess program which, by the way, Kasparov had full access to. He was able to study the program for months, even getting updated versions of the software. That wasn't the case with the Deep Blue match. It shouldn't have been the case at all. You don't let the other team read your playbook, but that was a condition of Kasparov's involvement.

The shocking thing about the rematch was the timidity of Kasparov's play. This was a man desperately afraid to lose, at any cost. He offered draws when viable (albeit risky) lines of play remained, and was cautious to a fault. The result was exactly what Kasparov wanted: He didn't lose. Over six games, he played *Junior* to a draw. And *Junior* is no Deep Blue. All this made the entire hugely-hyped affair (it ran live on ESPN, for God's sake) exceedingly unimpressive. The games themselves are interesting to study more for their insight into Kasparov's mental state than as brilliant examples of chess playing. Kasparov, like most chess geniuses, is not exactly known for his mental stability. Think about it: Grandmasters spend massive amounts of time and energy using some of the highest functions of human intellect for an ultimately meaningless and frivolous pursuit. (And I say that as a chess buff.) A chess grandmaster is gifted with a profound and rare intellect, which he applies to... pushing little wooden things around a board.

Needless to say, a person with such a mind would find the prospect of a machine besting him at his life's work utterly terrifying. And so, Kasparov played *Junior* not to win, but to draw. It's a way of reordering the world, of reassuring himself that he's not expendable, when in fact—measured against the profound pursuits of science, for instance—he always was expendable. That's the beauty of it. As humans, we may need profound pursuits to survive, but we need frivolous pursuits to really thrive. Programmers can improve *Junior* from now to kingdom come, and the machine will still never understand that vital fact.

*Tom McDonald has been covering games for countless magazines and newspapers for 11 years. He lives in the New Jersey Pine Barrens.*



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*See Web site for details.

Prices may vary according to specific system requirements. The price listed was valid on 2/14/03 when we sent this ad to the publisher; however, prices may have dramatically increased or decreased since then. Visit the FAQ section of Crucial.com to learn more about why memory prices go up and down.

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# Head2Head

**A showdown among natural PC competitors**

## THIS MONTH: nVidia GeForce FX vs. Radeon 9800 Pro

Like all great rivals—Ali and Frasier, Coke and Pepsi, Emmanuel Lewis and Gary Coleman—nVidia and ATI have spent years at each other's throats. Ever since the decline of 3dfx in late 2000, nVidia dominated much of the 3D graphics arena, while ATI played catch-up. But that changed when ATI launched the first DirectX 9 3D accelerator last fall. The Radeon 9700 Pro not only had a more advanced feature set than nVidia's GeForce4 4600, it was also much faster.

The counterpunch from nVidia is the new GeForce FX, a DirectX 9-compatible chipset running at an unheard of 500MHz/500MHz for its core and memory speeds. The GeForce FX was announced in a "paper launch" at the last Fall Comdex, and after countless delay rumors, reports of low yields, and the unveiling of an immense cooling apparatus, we finally received a final, reviewable board in time for this month's issue.

The delay in sending us a GeForce FX 5800 Ultra created an interesting situation. As nVidia was sending its ATI-killer to the press, ATI was quietly putting the finishing touches on its GeForce FX-killer—quite a leapfrog maneuver from the wily ATI brain trust. As serendipity would have it, three short days after receiving a reviewable nVidia board, *Maximum PC* became the first PC testing organization to have an ATI Radeon 9800 Pro nestled snugly in an AGP slot. The scores you see in this article and on our web site are a *Maximum PC* exclusive.

To test the two 3D gargantuans, we needed the fastest CPU, motherboard, and memory we could rustle up. Our new 3D test bed, Ol' Speedy, sports a 3.06GHz Pentium 4, half a gig of PC1066 RDRAM, and a Sound Blaster Audigy 2 plugged into an Intel D850EMV2 motherboard.

**—WILL SMITH**

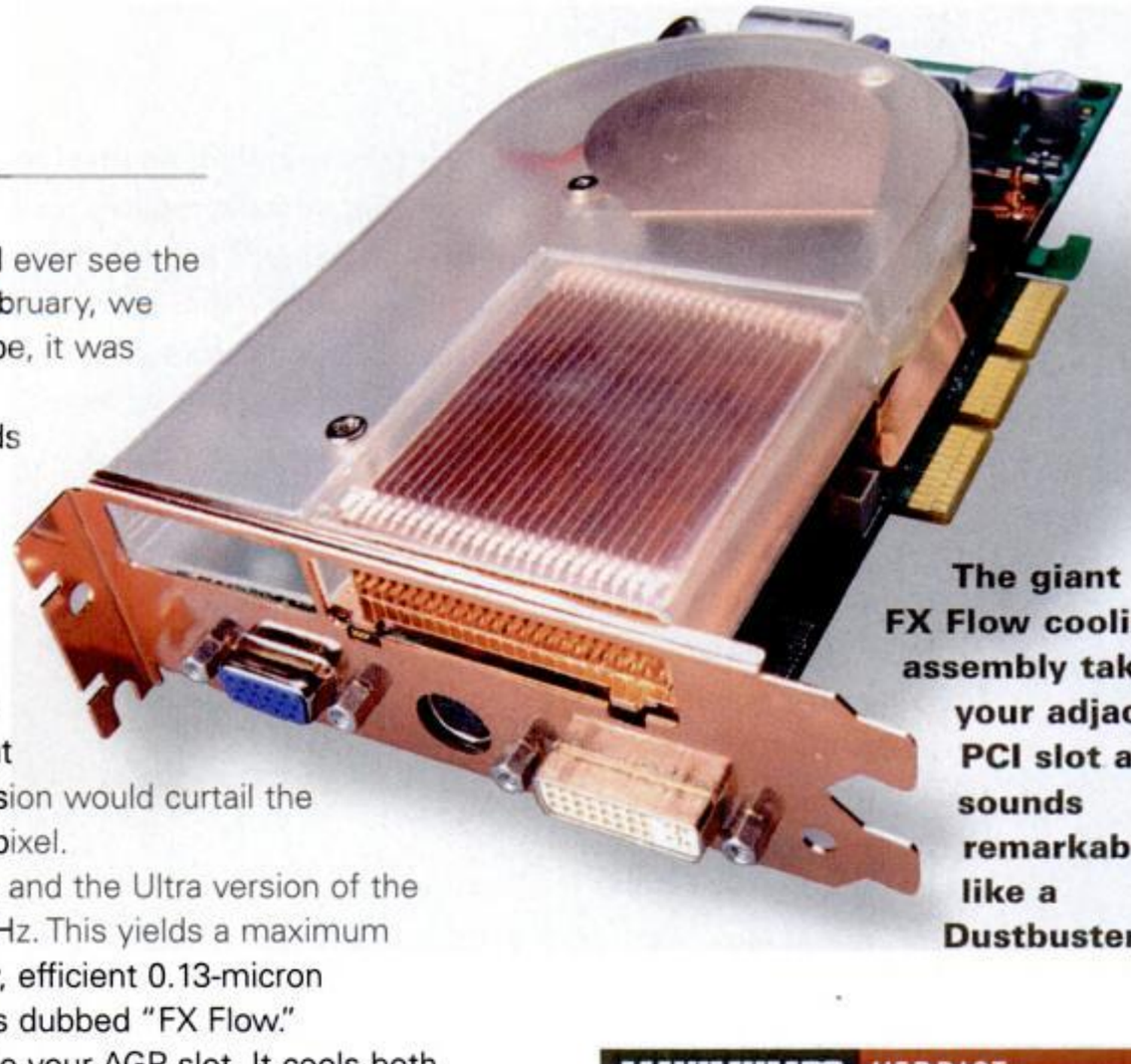
## NVIDIA GEFORCE FX 5800 ULTRA

We sat through the entire month of January wondering if we'd ever see the GeForce FX. When we finally got our reviewable board in February, we had to check the calendar to make sure it wasn't April 1. Nope, it was still early February. It appeared nVidia was for real.

The FX 5800 Ultra is much more than a GeForce4 on speed. It adds full DirectX 9 support, including programmable shaders that conform to the Pixel Shader 2.0 and Vertex Shader 2.0 specs. Like the Radeon 9700, the FX allows developers to use 64-bit and 128-bit floating-point numbers to describe colors. This is one of the most significant enhancements in 3D acceleration since we got fully accelerated 32-bit integer rendering. By using floating-point numbers (instead of integer numbers) for color information, rounding errors that cause visual artifacts are eliminated. For example, floating-point precision would curtail the banding that occurs when many textures or shaders are applied to a pixel.

The FX's raw stats are impressive. Its NV30 core runs at 500MHz, and the Ultra version of the FX 5800 sports 128MB of DDR II memory running at a blazing 500MHz. This yields a maximum theoretical memory bandwidth of about 16GB/s. Despite using a new, efficient 0.13-micron process, the FX requires a powerful cooling solution, which nVidia has dubbed "FX Flow."

The FX Flow apparatus is so large, it consumes the PCI slot next to your AGP slot. It cools both the memory and GPU using not only heavy copper heatsinks, but also copper rods that draw away some of the heat generated by the card. The contraption routes cool air from an external air intake, sends it over the GPU, then draws it through a Y.S. Tech blower. From there, the air goes over a copper radiator, and then out an exhaust port next to the intake. We measured temperatures at the exhaust port and on various parts of the card, top and bottom. The hottest temperature we recorded was 150° F degrees near the power connector, and the air blowing out of the FX Flow wavered between 95° F and 100° F. Despite its bulky appearance and loud fan, the FX Flow does its job well, keeping the hyper-clocked GeForce FX cool. But how does the new FX compare with the new Radeon 9800 Pro? Read on...



**The giant FX Flow cooling assembly takes up your adjacent PCI slot and sounds remarkably like a Dustbuster.**

| THE SPECS | NVIDIA GEFORCE FX 5800 ULTRA |
|---|---|
| Core type: | nVidia NV30 |
| Core clock: | 500MHz |
| Core process: | 0.13-micron |
| Memory type: | DDR II |
| Memory size: | 128MB |
| Memory speed: | 500MHz |
| Retail availability: | Late February |

**MAXIMUM PC VERDICT**

***GeForce FX 5800 Ultra***
NVIDIA

**+ ALI**

It's one of the fastest 3D chipsets available. The cooling contraption looks very he-man.

**– FRASIER**

It's fast, but only faster than the 9800 Pro in a few benchmarks. The noise is annoying, and we don't like giving up a PCI slot. We can do better for $400.

**www.nvidia.com**
**$400**

**7**



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# ATI RADEON 9800 PRO

MAXIMUM PC KICK ASS PRODUCT

The Radeon 9800 Pro is essentially a speed-bumped version of the Radeon 9700 Pro. Sure, there are some core enhancements, a more efficient anti-aliasing engine, tweaks to the programmable shaders, and some optimization in the memory pipeline. But besides that, ATI's 9700 Pro and 9800 Pro are virtually the same.

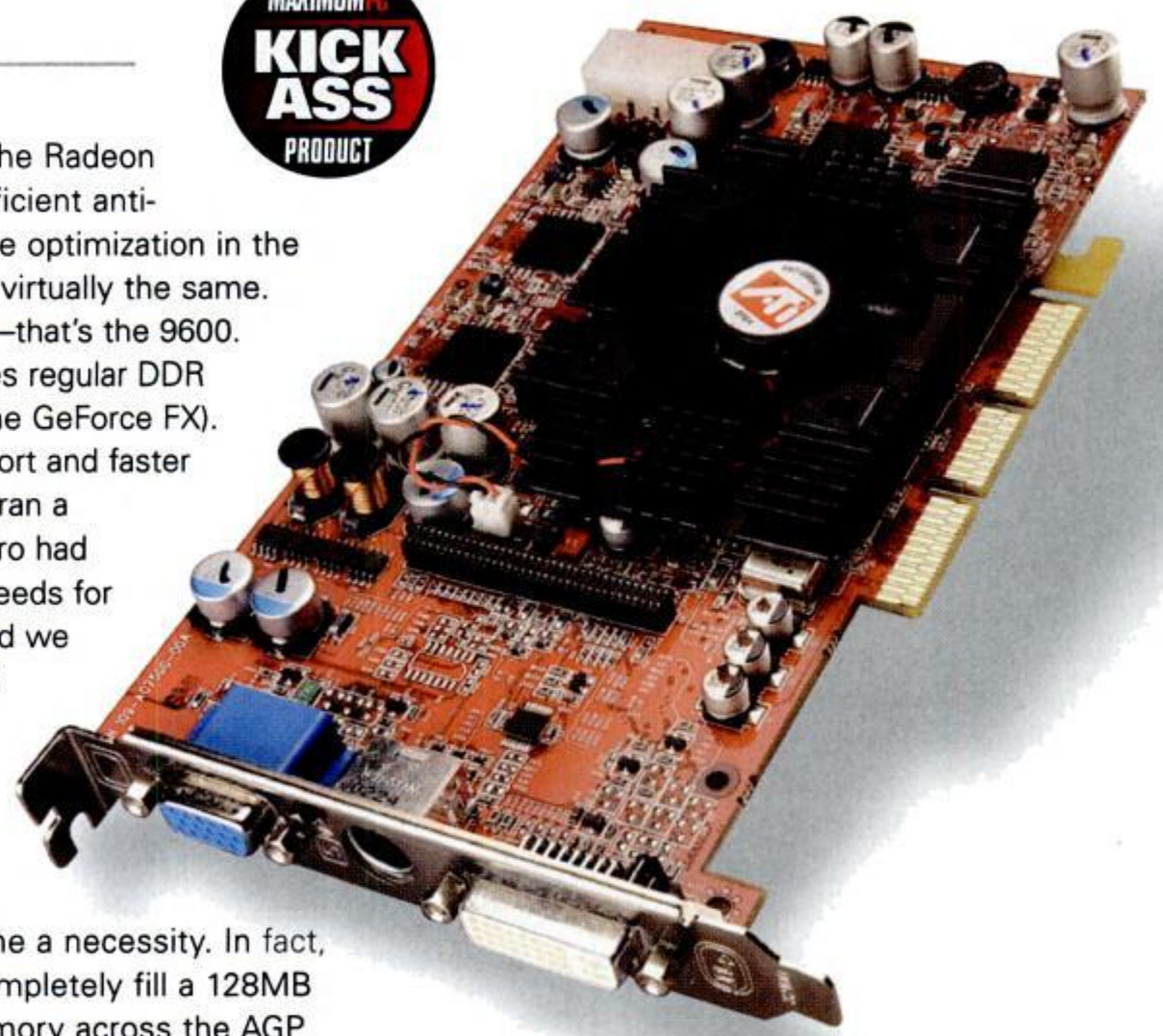
Also be aware that the 9800 Pro is not ATI's new 0.13-micron part—that's the 9600. And please note that the standard 128MB version of the 9800 Pro uses regular DDR memory, whereas an upcoming 256MB version will use DDR II (like the GeForce FX).

What the Radeon 9800 Pro *does* offer is full DirectX 9 shader support and faster clock speeds than ATI has ever shipped before. The board ATI sent us ran a 378MHz core and 338MHz memory clock. (In comparison, the 9700 Pro had stock frequencies of 325MHz and 310MHz, respectively.) The clock speeds for the 9800 Pro weren't yet final at press time, but we do know the board we tested was set for minimum speeds. ATI is hoping to ship final boards with a 400MHz core and 350MHz memory clock.

The Radeon 9800 Pro will be available in two different configurations. The first uses 128MB of DDR memory, and should sell for $400. A second, 256MB, DDR II version will also be available, but its price hasn't yet been announced. For high-resolution, high-detail 3D graphics, 256MB frame buffers will become a necessity. In fact, several of the tests in the new *3DMark2003* benchmarking suite completely fill a 128MB frame buffer, and resort to storing vertex information in system memory across the AGP bus when onboard memory is filled. While we're sure that *DOOM III* will run on cards with a 128MB buffer, we also bet that the game (as well as games based on Carmack's engine) will be able to take advantage of 256MB.

One of the main improvements in ATI's Radeon series is the new FIFO buffer, which lets developers run extremely long shader programs without any extra coding. Previously, developers had to jump through hoops in order to run programs longer than what the 9700 supports. It must be noted that nVidia's shader implementation in the GeForce FX supports extremely long shader programs as well.

By offering twice the GPU-to-memory pipeline width of the GeForce FX, the new ATI card is able to transfer twice as much data per clock cycle. This lets ATI maintain a bandwidth advantage without having to crank its memory clocks way up. The Radeon's memory pipeline can transfer data at about 21.6GB/s. In comparison, even with a scorching 500MHz memory clock, the GeForce FX 5800 Ultra can manage just 16GB/s. ATI is gambling that the Radeon's memory-bandwidth surplus will keep it competitive with the GeForce FX's significantly faster core. But how do the two cards benchmark? Turn the page to find out.



**Despite its humble appearance, the Radeon 9800 Pro manages to pack GeForce FX-killing power into a single slot.**

| THE SPECS | ATI RADEON 9800 PRO |
|---|---|
| Core type: | ATI R350 |
| Core clock: | 378MHz* |
| Core process: | 0.15-micron |
| Memory type: | DDR |
| Memory size: | 128MB |
| Memory speed: | 338MHz* |
| Retail availability: | Early March |

** Final clock speeds for the Radeon 9800 Pro weren't yet finalized at press time. However, ATI says they will be at least as fast as the numbers listed here, and probably faster.*

MAXIMUM PC VERDICT

***Radeon 9800 Pro***
ATI

**+ COKE**
The 9800 Pro is the fastest thing around, and it looks great too!

**– PEPSI**
No high-end 3D accelerator is cheap, so if we're going to spend more than $300 for a 3D card, we want a 256MB model.

**www.ati.com**
**$400**
**9**

## THE UPSHOT

Which card to buy? GeForce FX or Radeon 9800? That's the $400 question, isn't it, Billy?

### BENCHMARK PROWESS

The battle for frame rate supremacy was intense. ATI won the majority of tests, but nVidia chalked up wins in a few key categories. The ATI card took top honors in the benchmarks that are limited by a card's memory bandwidth, while the GeForce FX scored big in benchmarks that stress GPU performance.

The GeForce FX 5800 Ultra performed best when running with 2x AA and 8x aniso filtering enabled. In *Quake III* at those settings, the nVidia card was almost 38 percent faster than the 9800 Pro, nearly mirroring the actual speed difference between the two cards' core speeds. But when we increased AA settings to 4x, the GeForce FX's memory-bandwidth handicap actually made it 7 percent slower than the ATI card in *Quake III*.

Again, ATI's primary advantage is its faster memory pipeline. In any benchmark that's memory-bandwidth intensive—such as *Dungeon Siege* at high res with AA and aniso enabled, or pretty much anything else at 1600x1200 with 4x AA enabled—the ATI card has a definitive lead over the GeForce FX. Fortunately for ATI, most of today's games are memory-bandwidth limited, which gives ATI a clear advantage in both today's games and the increasingly complex games we'll see next year. **WINNER: ATI**

### IMAGE QUALITY

In our opinion, ATI's Radeon 9800 produces better-looking visual effects across the board. Unfortunately, we don't have

*continued on next page*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## THE UPSHOT (CONTINUED)

enough room in the magazine to show you the large screenshots that would back up our point, and as always, our relatively hooptie four-color printing can't do RGB screen grabs justice. But we can tell you that the 9800's 2x anti-aliasing is comparable to nVidia's Quincunx and even 4x AA mode. Textures are more vibrant and less filtered-looking on the 9800, as well. We ran the cards side by side so we could do direct visual comparisons, and differences were immediately apparent. **WINNER: ATI**

### DRIVER STABILITY

ATI has had a lot of trouble with driver performance and reliability in the past, but the latest revs of the ATI cards have been rock solid after initial bug-fix driver releases. Furthermore, ATI has had six months to tweak and tune the 9700 drivers, so you can rest assured that the essentially identical Radeon 9800 drivers are fast and reliable out of the box. We saw no bugs with the early 9800 drivers.

Of course, nVidia's drivers are the gold standard for driver stability. Rapid response to reported bugs, as well as frequent speed bumps, have made us fans of the nVidia driver development team since day one. That said, we did see some rendering errors and other buggy behavior with the early GeForce FX drivers. Nonetheless, we're confident that nVidia will fix the flaws.
**WINNER: Draw**

### NOISE AND COOLING

The GeForce FX's loud cooling contraption has spurred more exaggerated online condemnation than any other piece of gaming hardware since the Xbox's monstrous controller debuted. Now, don't get us wrong; much of the harsh opining is well-deserved. The FX's single fan is damn loud, especially when compared with the quiet fan on the 9800 Pro (and even when compared with the four fans on the legendary 3dfx Voodoo5 6000, for that matter). Some of our staff editors say the fan noise is a deal-breaker, and we can only assume some readers would agree. To reduce excess noise, the fan spins up only when the card's 3D pipelines are activated, and shuts down in 2D mode (the transition from 3D to 2D mode sounds likes a jet engine spooling down).

And it's really not just about the noise. The whole FX Flow cooling apparatus seems half-baked. It doesn't include any sort of filter over the intake, so after a few months of use, the nice, clean fan assembly will likely be an absolutely filthy mess. The proper way to clean it, we do not yet know. On the other hand, the ATI card has no readily apparent cooling flaws. It uses the exact same cooler as the 9700 Pro. **WINNER: ATI**

### THE FINAL VERDICT

Let's see, here. One card is fast but noisy. The second card is faster and not noisy. The choice is clear.

That said, whether you should upgrade to a 9800 Pro depends on what card you're currently running. If you already have a Radeon 9700, 9700 Pro, 9500, or 9500 Pro, you can probably safely wait six months or so for a crop of fresh 3D accelerators. But if you're running anything that's slower than a GeForce4 4600 or Radeon 9000, you'd be well-served by upgrading to the 9800 Pro. You'll get a hefty speed boost, and you should be able to run games at higher resolutions with more features turned on.

This month, we reviewed final, reviewable reference boards from both companies. Next month, we hope to review shipping, retail products from nVidia and ATI partners. Let's see who's overclocking, shall we?

| GEFORCE FX vs. RADEON 9800 PRO | HIGH QUALITY | | MEDIUM QUALITY | | LOW QUALITY | |
|---|---|---|---|---|---|---|
| | GEFORCE FX | RADEON 9800 | GEFORCE FX | RADEON 9800 | GEFORCE FX | RADEON 9800 |
| 3DMark 2001:SE Overall | 11115 | **11629** | 12730 | **13129** | 15516 | **16871** |
| 3DMark 2001:SE Game 2 | 79.6 | **85.1** | **108.7** | 101.6 | 137.2 | **150.2** |
| 3DMark 2001:SE Nature | **37** | 33.8 | **50** | 40.5 | 77.7 | **83.2** |
| 3DMark 2003 Overall | 1747 | **2674** | 2429 | **3760** | 5263 | **5587** |
| Quake III Maximum PC | 61.4 | **66** | **112.6** | 81.9 | **147.2** | 136 |
| Dungeon Siege | 39.6 | **75.49** | 53.67 | **86.8** | 70.21 | **84.84** |
| Serious Sam 2 | 26.8 | **27.4** | **37** | 27.6 | **71.6** | 62.9 |
| UT 2003: Fly-by | 51.8 | **75.9** | 74.5 | **75.9** | **145.2** | 135.3 |
| UT 2003: Bot-match | 35.6 | **47** | 46.3 | **47** | 69.5 | **71.4** |

*We ran everything on Ol' Speedy, our new 3.06GHz Pentium 4 test bed. Low Quality settings have no anti-aliasing and no anisotropic filtering. Medium Quality settings are 2x AA and 8x aniso. High Quality settings are 4x AA and 8x aniso. All tests are run in 32-bit color. We ran Dungeon Siege, the Quake III MaxPC demo, both Unreal Tournament 2003 benchmarks, and Serious Sam: The Second Encounter at 1600x1200. For Serious Sam, the Extreme GFX setting was used as well. 3DMark2001:SE Game 2 and Game 4 are reported at 1280x1024, but the 3DMark 2001:SE overall score is run with default settings. 3DMark2003 is run at default settings (1024x768).* ***Best scores are bolded.***



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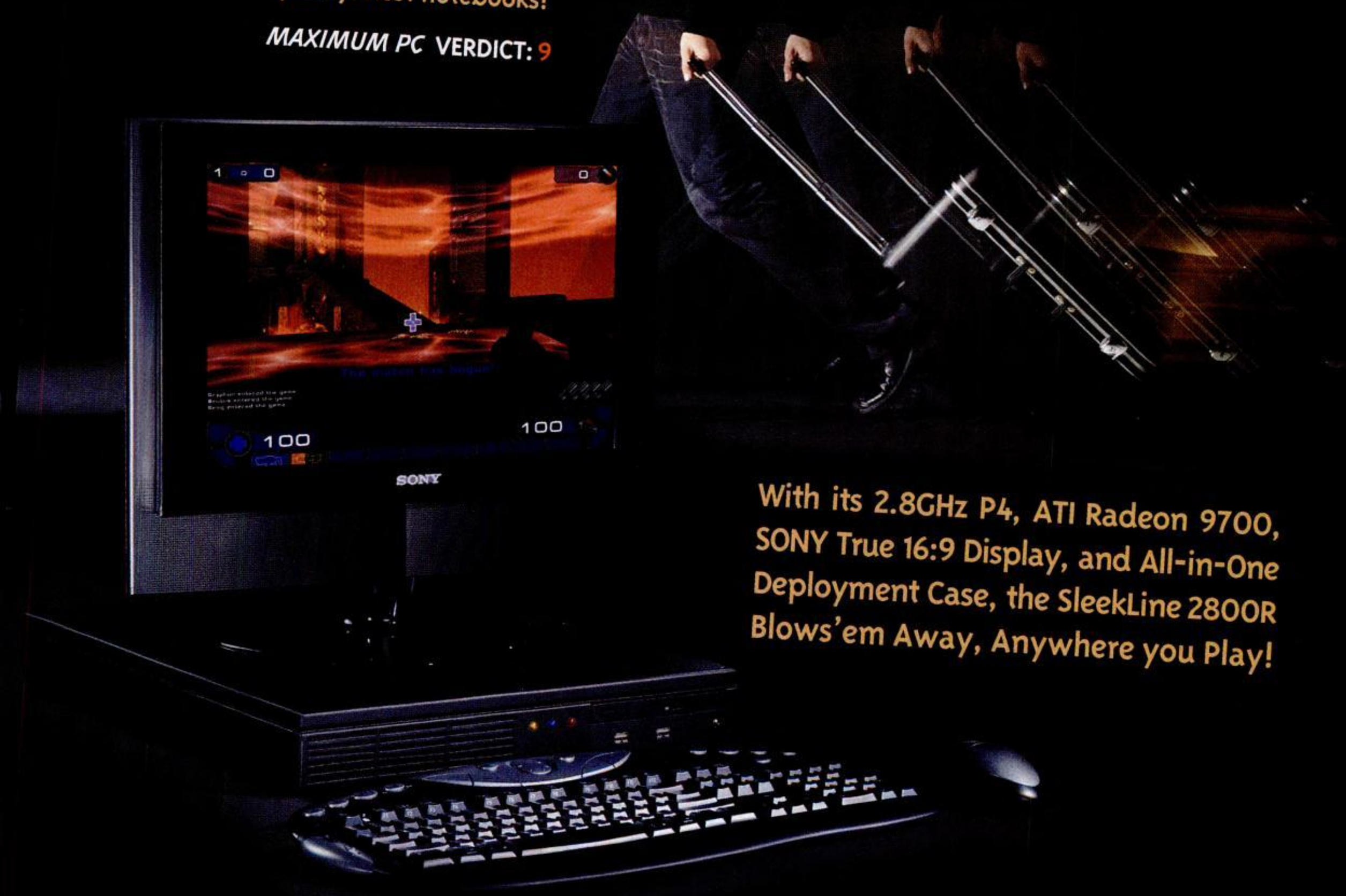
# Roll'n with Rock'n Performance.

SleekLine's *3DMark2001 SE* score of 69.5 fps is comparable to $5,000 full-size gaming PCs and more than twice that of the fastest notebooks!

*MAXIMUM PC* VERDICT: 9

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# DURING THE ILE CRISIS?

## LIFE STOOD STILL FOR 13 MINUTES.

History changes in an instant. Never more so than in Rise of Nations, a new real-time strategy game from Brian Reynolds, lead designer of Civilization II. Experience the depth of turn-based strategy games and the fast-paced action of RTS that covers 6,000 years of history and 18 ancient civilizations. It's the most intense RTS of its kind. Think fast. Fight faster. Defend, defeat, bargain, befriend, plot and plunder. Do it all under the gun with zero margin for error. Nothing is historically impossible, and only the quick and the brazen survive.

MAKE HISTORY

COMING APRIL 22, 2003

RISE OF NATIONS

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# WatchDog

Say hello to Pixel, WatchDog of the Month.

**Maximum PC takes a bite out of bad gear**

## THIS MONTH: The WatchDog goes after...

> DataPlay > ProVantage.com >AMD >APC

**DataPlay never gained widespread momentum and has now filed for bankruptcy.**

### Turbo Complaints

**FROM THE DUH.COM FILES: Intuit says that for next tax season it won't implement as draconian a copy-protection scheme as the one used in this year's *TurboTax* app. Users howled when the most recent release of *TurboTax* included a protection scheme called SafeCast that keyed the software to a machine and prevented tax returns from being filed or printed without SafeCast being present. Problems cropped up when people noticed that even after uninstalling *TurboTax*, SafeCast remained in the background eating memory and doing God knows what. Even worse, some users reported that after performing an OS reinstall or swapping a hard drive, they couldn't reload *TurboTax* without being told they had to pay for another license. With a massive PR fiasco brewing, Intuit did an about-face and said it would patch the program automatically to uninstall SafeCast.**

***At press time, DataPlay assets were being sold with the outcome of the format unknown.***

**The company said it's working with Macrovision to create a version of SafeCast that runs only when *TurboTax* is running. Next year, Intuit says, it won't screw up so badly. Woof.**

### Data No Play

**DEAR DOG:** I bought one of IRiver's players that use the miniature 500MB DataPlay discs. After experiencing numerous problems with the player, I was passed directly to DataPlay for help. The folks at DataPlay were great and gave me updated software as well as some free media, hats, and T-shirts. However, none of it helped as I continued to have issues transferring data. And because the discs are write-once, if your machine locks up during a transfer, the disc is wasted. The techs at DataPlay said I would be contacted in a few months when revised software came out, but now when I call the support number it just rings. The DataPlay web site seems to be gone too. What's going on and how could such a promising technology be a dollar short and a day late?

**— ANDY FROM FLORIDA**

**THE DOG RESPONDS: Born during the dot.com frenzy, DataPlay suffered a meltdown when it was unable to secure further funding in late 2002. The company consequently axed its final 120 workers and filed for bankruptcy in October. The DataPlay format was hyped big time when it was initially introduced, and singers such as Britney Spears and 'N Sync had plans to release albums in the DataPlay format. DataPlay's big appeal was its capacity and price. You could buy three discs, or 1.5GB, for about $40— something you otherwise can't do even with today's low prices in flash memory. Although the major record labels pledged support, DataPlay never had any support from the consumer electronic companies. At press time, DataPlay assets were being sold with the outcome of the format unknown.**

**Officials at IRiver told the Dog that, despite the gloomy outlook for the struggling format, there's still a glimmer of hope. IRiver believes that the buyers of DataPlay's assets will continue to support the format. In the meantime, a spokesman said he would have IRiver's technical support contact Andy to see if they could correct the problem. IRiver continues to sell its DataPlay-based device and will for at least three to six months.**

**The Dog also spoke with officials at Imation, one of the primary manufacturers of DataPlay discs. A spokesman said Imation has no plans to discontinue the format and fully expects someone to pick up after DataPlay.**

**The Dog's advice? Steer clear of the players and discs. Unless you're the kind of person who has a pile of Betamax tapes and Laserdiscs, there isn't much appeal to the DataPlay format at this time. Ruff!**

### Really Excessive Shipping and Handling

**DEAR DOG:** I just wanted to bring something to your readers' attention in an attempt to save someone from getting burned. I was searching Google in January for good deals on DVD+R media, and Provantage.com popped up with a price of just $1 a piece—a great deal. After I hit the purchase button and got an estimate for the shipping, I was shocked.

The company wanted to charge me $148.50 to ship 30 DVDs from Ohio to Washington D.C.! I was floored, so I called thinking the web site was messed up. A customer service rep said the shipping price was correct; since they are selling the discs below cost they have to make up the difference. I told her that this was deceptive; she said it was not.

I just hope others are paying attention when buying online.

**— STEVEN KELLER**

**THE DOG RESPONDS: The Dog paid a visit to Provantage.com and verified that the company was indeed offering DVD+RW discs for $1. The price on shipping, however, was $5 per disc. To ship 30 discs to California costs $150.90. Something was clearly amiss. Posing as an average consumer, the Dog called Provantage.com and asked about the pricing. A customer service rep looked at the pricing and said there was probably something wrong with the web site. She said it would be corrected in a day. Provantage.com corrected the price by increasing the cost of**



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**We've heard of painful shipping-and-handling charges, but this web site glitch takes the cake.**

blank discs to $4.92 per unit (a total of $147.60 for 30 discs). The shipping cost for the order dropped to $16.30.

When contacted about the problem, a company spokesman told the Dog that the shipping price was obviously an error in the database, as the company doesn't charge per disc. He said the company had experienced some glitches with its web site and most were corrected. When asked if he thought people might see the glitch as a "bait and switch" tactic, the spokesman said Provantage has never engaged in the tactic and has been in business since 1984. The fact that Provantage corrected the price when the Dog contacted the company as a consumer seems to verify this—$4.92 certainly isn't a steal for a blank DVD+R these days. Steven's message is one to take to heart, though. When shopping online, always factor in the price of shipping and handling, and be aware of gouging. Grrr...

## Chip Mix-Up

**DEAR DOG:** I just recently bought a boxed AMD 2600+ 333 FSB from a reputable dealer. When I installed it in my Asus A7NX8 Deluxe mobo and set up the BIOS accordingly, I kept getting a CPU overspeed alarm. After several attempts to make it work, I pulled out the proc and went to AMD's web site to investigate. It turns out that it's actually a 266 FSB proc in a 333 FSB retail package. I contacted AMD, was issued an RMA, and told that it could take as long as two weeks before I'll get a replacement. This really irks me because I've been shopping around and buying parts for three weeks, and now that I have them all, I have to wait another two weeks before I can fire up my "dream machine," and I paid $16 to ship the CPU back.

Please advise your readers to look very carefully at any boxed AMD procs before they lay down the cash.

**—JON RUYLE**

**THE DOG RESPONDS: Although it may seem like an isolated incident, Jon is actually the second reader to complain about a mixed up CPU. Michael T. Granito, whom readers may remember from his litigation against IBM and its flaming 75GXP hard drive, wrote the Dog to say he also received a mislabeled 2600+ in retail packaging. AMD officials confirmed that a small number of Athlon 2600+ CPUs labeled as having a 333 FSB were in fact 266 FSB procs. AMD said roughly 500 CPUs were mislabeled as such and the problem has been corrected. Reportedly, the CPUs themselves are labeled correctly, but a production glitch put the wrong stickers on the boxes.**

**The company believes most of the problem chips were caught before reaching consumers. As for the few mislabeled CPUs that did slip through, AMD advises consumers to**

***"It turns out that it's actually a 266 FSB proc in a 333 FSB retail package."***

**contact the store where they purchased the CPU for a direct exchange before contacting AMD for an RMA. For information on how to decode your AMD chip, please see this month's feature on Barton (page 38). ■**

Got a bone to pick with a vendor? Been spiked by a fly-by-night operation? Sic The Dog on them by writing **watchdog@maximumpc.com**. The Dog promises to get to as many letters as possible, but only has four paws to work with.

## RECALL ALERT

### If you don't get shocked, you might get burned

**American Power Conversion is recalling some 2.1 million uninterruptible power supply (UPS) units which may overheat, melt, and start a fire. APC said it has received eight reports of the units overheating, with three resulting in minor property damage. The company said 950,000 units were sold in the United States. The affected units are the Back-UPS CS350 and the CS500 that were manufactured between November 2000 and December 2002. They were mainly sold through distributors as well as via catalog and retail stores. Both models were targeted at consumers and busines users. To check your unit, look at the bottom of it for a label. The label should have two bar codes, each one followed by a line of text. The first line of text is the model number, and the second line of text is the serial number. First check to see if you have one of the following models: BK325I, BK325-RS, BK350, BK350EI, BK350-AZ, BK350-FR, BK350-GR, BK350-IT, BK350-UK, BK350JP, BK350IX218, BK475I, BK475-RS, BK500, BK500EI, BK500-AZ, BK500-BR, BK500-FR, BK500-GR, BK500-IT, BK500-UK, BK500BLK, BK500JP, or BK500TW. If you do, check the serial number. If the first six characters are within the range of AB0048 through AB0251, or JB0125 through JB0251, your UPS is one of the recalled units. (If the serial number ends with an "R," it's not part of the recall.) If you find that your UPS is one of the potentially bad units, immediately turn off any equipment connected to it, and then turn off the UPS and unplug it. You should then call APC at 866.272.7359 during normal business hours for instructions on exchanging the unit. More information on the recall as well as an online registration tool to exchange the unit is available at www.apc.com/rely.**

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# ULTIMATE BUDGET UPGRADES

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We love PCs. Shamelessly and unapologetically, we pore over our rigs as if they were sacred artifacts from an alien world. We tweak, benchmark, upgrade, and benchmark again with a compulsion usually manifest in certain mental disorders. We're constantly on the lookout for better technology, and faster, more efficient components. The quest for buttery-smooth frame rates, instantaneous file transfers, and graphics rendering that doesn't require a coffee break to endure is never-ending. But there's just one tiny problem.

This stuff costs megabucks.

Pentium 4 3GHz, *ka-ching!* Radeon 9700 Pro, *ka-ching!* Four 120GB hard drives striped in a RAID 0 array, *ka-ching!* The fact is, if we indulged our passion to its natural extreme, we'd end up with the fastest rigs on Earth, but sitting in some nasty homeless shelter eating cat food with a spork.

Over the years, every *Maximum PC* tech geek has learned to balance an insatiable lust for state-of-the-art hardware with the humble limits of an editor's salary. We've learned to cast a skeptical eye at expensive new hardware that might not live up to its hype, and we're always mindful that inexpensive, off-brand components might hold pleasant surprises. Dare we say it, getting the *best performance for the money* is often of more concern than simply determining which component runs the fastest.

So, on the following pages, we serve our more cash-strapped readers, and pay homage to price-to-performance ratios. We've got the names, brands, and benchmarks of budget parts that perform far beyond what their sticker prices might suggest. Monitors, CPUs, hard drives—in every component category, there's an inexpensive diamond in the rough that's just waiting to blow your rig through the roof, and we're going to tell you exactly what to buy whenever possible.

We even found budget notebooks whose power and features took us by surprise. Interestingly, we originally solicited manufacturers for sub-$1,000 notebooks. Whoops. What a catastrophe. The specs we got on the few models we could find were so appalling, we figured that bringing them into the Lab for certain humiliation would have been cruel and not particularly helpful.

If you're a rock star or rich enough to be suspected of securities fraud, you may just want to skip this story. But if you want to know how to get the most performance out of your PC for the least amount of cash, then, please, read on.



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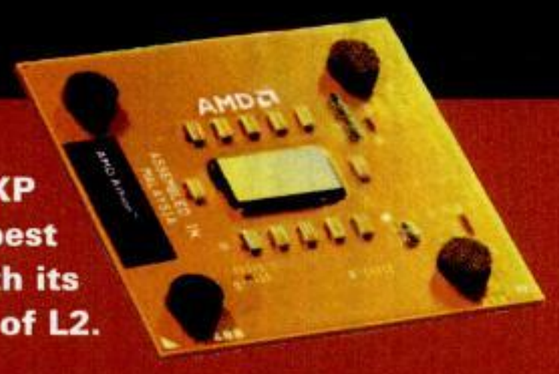
# ULTIMATE BUDGET UPGRADES

**If you can live without Hyper-Threading—and we think you can—Intel's 2.53GHz P4 is one of the best bargains in town.**

## CPUs



**AMD's new Athlon XP 2500+ should yield the best bang for the buck with its 512KB of L2.**

### The best Intel and AMD values: low-priced, but don't call 'em 'budget'

When CPU manufacturers market their budget chips, they want you to think "Celeron" and "Duron." Well, flunk that. If you want a reasonably priced CPU that doesn't cripple your rig with sluggish performance, don't waste your cash on those inferior chips. They're certainly the procs that Intel and AMD have *designated* as "budget," but in our book, they're too slow to even consider.

Instead, you should turn to top-shelf chips clocked somewhere below the cutting-edge. Here's the deal: Whenever a new speed in a CPU family is introduced, the previously fastest chips drop in price. We tend to pay a pretty premium for having the best, and from a price-to-performance ratio standpoint, it often makes sense to buy slightly aged technology. The question is, How much performance do you give up by going with this morning's CPU instead of this afternoon's? We crunched the numbers on AMD's and Intel's CPUs to figure out which chips give you the most performance for the money.

In the following analysis, we *will* be talking in terms of megahertz per dollar spent. We know, we know: Megahertz isn't the end-all, be-all of performance. However, within each family of chips, it is true that megahertz equals real-world speed. A 2.8GHz P4 will run software faster than a 2.66GHz P4, and the same reasoning holds true for Athlon XPs.

To determine the best budget CPUs from both companies, we looked at chip prices when sold in lots of 1,000. When looking at Intel's P4 family, we simply divided a chip's clock speed by its price to determine a price-per-megahertz rating. We did look at P4s that run on the 400MHz bus, but we don't recommend that you invest in these CPUs. For the money—not to mention for future upgrading opportunities—there's just no point in getting anything slower than a 533MHz FSB Pentium 4.

**BUYER'S TIP**

A retail-boxed chip will cost an additional $20 to $40 compared with a "white-box" unit. Just be aware that only retail-boxed CPUs carry the full Intel or AMD warranty.

Intel's current CPU king is the 3GHz P4. At $637 per chip, it costs 21 cents per megahertz—very expensive. But by dropping down 206MHz, and going to a 2.8GHz P4, you're suddenly forking out just 14 cents per megahertz. That's a savings of $236 dollars, but we still haven't hit the sweet spot yet.

We took a long, hard look at Intel's 2.66GHz, which offers a compelling price/performance ratio of 11 cents per megahertz. That's nice, but for $60 less, you can have a 2.53GHz P4. Now *there's* the sweet spot. At $243, it's a steal. The 2.53GHz certainly isn't as speedy as the 3GHz, but it does run on a 533MHz bus, and will almost certainly be sufficiently kick-ass for any game released in 2003. It really has only one possible shortcoming: no Hyper-Threading support.

In AMD land, we automatically disqualified the "original" Athlon XP 2600+, which runs at 2.1GHz on a 266MHz bus. In order to offer competitive performance, we feel the Athlon XP needs to ride on a 333MHz bus. Does this mean the 3000+ is a good deal? Not really. At $588, AMD's finest 333MHz bus CPU is almost as painfully expensive as the 3GHz Pentium 4.

Dig deep, however, and you'll find two compelling options: The first is the newer, "Rev B" 2600+, which is clocked at 2.06GHz and rides the 333MHz bus. The other option is the new Barton 2500+. It clocks in at just 1.83GHz, but rides a 333MHz bus and offers double the L2 cache of previous Athlon XPs. The Rev B 2600+ is about $60 more than the 2500+, just like the 2.66GHz P4 is about $60 more than the 2.53GHz. And don't underestimate the value of the 2500+: It might run slower than the 2600+, but offers double the L2 cache, and in some apps might prove to be faster than the higher-rated chip. With this in mind, we dub the 2500+ Barton to be AMD's budget leader.

Our analysis is based on fairly updated AMD info, but Intel's prices have been static since January. We fully expect Intel to slash prices by the time you read this, in order to put more pricing pressure on AMD. And if Intel releases an 800MHz bus anytime soon, prices in the 533MHz bus space could *really* undercut AMD.

**By dividing CPU speeds by CPU price, we determined the price-to-performance sweet spots**

**P4 Clock Speed-to-Price Ratio**

| MHZ | PRICE | PRICE PER MHZ |
|---|---|---|
| 3006 | $637 | $0.21 |
| 2800 | $401 | $0.14 |
| 2660 | $305 | $0.11 |
| **2600** | $305 | $0.12 |
| 2530 | $243 | $0.10 |
| **2500** | $243 | $0.10 |
| 2400 | $193 | $0.08 |
| 2260 | $193 | $0.09 |
| **2200** | $193 | $0.09 |

Bold denotes a 400FSB.

**Athlon XP Performance Ratings-to-Price Ratios**

| PR | PRICE | PRICE PER PR |
|---|---|---|
| **3000*** | $588 | $0.20 |
| **2800*** | $375 | $0.13 |
| **2700** | $349 | $0.13 |
| 2600 | $297 | $0.11 |
| **2600** | $297 | $0.11 |
| **2500*** | $239 | $0.10 |
| 2400 | $193 | $0.08 |
| 2200 | $157 | $0.07 |
| 2100 | $93 | $0.04 |
| 2000 | $83 | $0.04 |
| 1900 | $76 | $0.04 |
| 1800 | $69 | $0.04 |
| 1700 | $55 | $0.03 |

Bold denotes a 333FSB. The asterisk denotes a large L2.



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# VIDEOCARDS

## You needn't pay a pretty penny to get good-looking graphics

**The nVidia Ti 4200 has been around a while, but it's still a great card at a good price.**

It's a tough call: You want the fastest 3D acceleration on the market, but you'd rather not spend more on a videocard than some people spend on their entire systems. Well, look no further than ATI's Radeon 9500 Pro ($170, **www.ati.com**). For just about $60 more than the considerably slower nVidia GeForce Ti 4200, you get DirectX 9-compatible pixel shaders and fast enough performance to play tomorrow's games with all their visual effects enabled. In fact, the 9500 Pro should work fine with *DOOM III* and any other programmable shader games that come down the pike this year. Because the 9500 Pro is virtually identical to the Radeon 9700 Pro ($400), you'll be sporting the most advanced 3D architecture available today, even if it's not quite the fastest.

The 9500 Pro has the same number of DirectX 9 shader pipelines as the Radeon 9700 and 9700 Pro. The only architectural difference is that the 9500's memory pipeline is just 128-bits wide, whereas the 9700's is 256-bits wide. Please note that the Ti 4200's memory pipeline is also 128-bits wide.

The 9500 Pro's clocks are also somewhat slower than those of the higher-end ATI cards. The 9700 Pro's stock numbers are 325/310MHz (core and DDR memory, respectively), whereas the 9500 Pro hits 275/270MHz. That's a lot slower on paper, but in today's demanding gaming benchmarks, the 9500 Pro actually runs about 10 percent slower than the 9700 Pro—*yet it's about 40 percent cheaper.* There's the sweet spot for you.

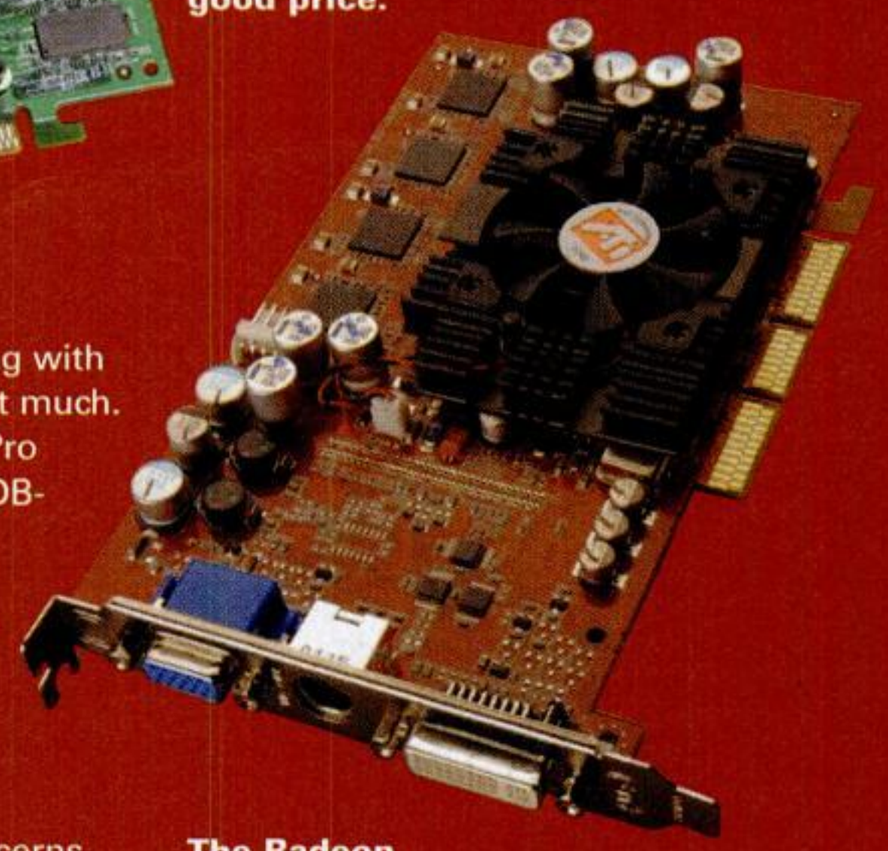
So what else do you lose along with 10 percent raw performance? Not much. Just like the 9700 Pro, the 9500 Pro has one DVI connector and one DB-15 connector, and dual 400MHz RAMDACs are ready to roll if you want to run two CRTs at high resolutions. The 9500 Pro also includes S-video output, so you can watch movies or play games on your TV.

Some folks have nagging concerns that ATI's drivers suffer compatibility problems with key games. That's a valid concern, but we can tell you that at *Maximum PC,* we've been running various iterations of high-end Radeon cards for the last several months with minimal problems. Compatibility issues with *Battlefield 1942* and *Mafia* were fixed with a patch last year. At press time, there were still minor rendering errors in *SimCity 4,* but they don't affect the playability of the game.

**BUYER'S TIP:**
3D graphics vendors like to pimp AGP 8x support, which ups the bandwidth between your CPU and 3D accelerator. However, all the AGP bandwidth in the world won't do you any good if your GPU is dog slow, or if your game just doesn't require extra bandwidth.

We realize that videocards are a touchy matter, and some of you might have some type of quasi-religious, tribal aversion to ATI products. (Fair enough. Some people will never buy Chevy because they grew up in a Ford household.) If you fall into this camp, you might consider one of the SiS Xabre boards, which range from super-cheap (and super-slow) to none-too-shabby.

The Xabre 200 ($70) rests firmly in the low end of the performance spectrum, and should be avoided by anyone who enjoys gaming. On the other hand, the Xabre 600 (about $120) is a decent performer, even though it lacks programmable vertex shaders (see last month's preview). Few manufacturers have embraced the higher-end Xabre, simply because it's nearly as expensive as the superior GeForce4 Ti 4200, which includes both programmable vertex and pixel shaders.



**The Radeon 9500 Pro delivers most of the power of the significantly more expensive Radeon 9700 Pro, at a much cheaper price. And it's ready for *DOOM III*.**

The GeForce4 Ti 4200 may have been eclipsed by faster technology, but it's still a perfectly respectable videocard. It features DirectX 8 programmable vertex and pixel shaders, a 128-bit DDR memory pipeline, and memory clocked at 257MHz. Most Ti 4200s' cores are clocked at 250MHz, although many vendors are shipping slightly overclocked cards. Like the ATI board, most nVidia GeForce4 Ti 4200s support multiple monitors—just make sure you verify support before buying. Unfortunately, the Ti 4200 probably won't have the oomph needed to play next-gen programmable shader games such as *DOOM III* with all the nifty effects turned on.

| Videocard Comparisons | RADEON 9700 PRO ($310) | | RADEON 9500 PRO ($170) | | GEFORCE4 TI 4800 ($200) | | GEFORCE4 TI 4200 ($110) | |
|---|---|---|---|---|---|---|---|---|
| | no AA | 2x AA | no AA | 2x AA | no AA | 2x AA | no AA | 2x AA |
| 3DMark 2001:SE Overall | 11987 | 10985 | 10870 | 9760 | 10182 | 8660 | 9465 | 7460 |
| UT2003: Botmatch (1600x1200) | 49 | 44 | 46.5 | 36 | 39.2 | 34.5 | 25.3 | 15.8 |

In this chart we compare two sets of natural competitors. ATI's 9700 Pro now goes up against nVidia's Ti 4800, while the 9500 Pro easily spanks the Ti 4200.



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# ULTIMATE BUDGET UPGRADES

**Although they're no longer the fastest IDE drives available, we think the JB series of drives from Western Digital represent the best value for budget geeks.**

## Hard Drives

### Yes, you *can* have an 8MB cache in a budget drive

Putting a pokey hard drive into an otherwise fast system is like putting snow chains on a brand-new Ferrari. While we're all for being thrifty, we don't recommend that you cut too many corners when it comes to hard drive performance; you could end up killing the speed of your entire PC. For this very reason, we recommend the 80GB Western Digital Special Edition ($105 street, **www.westerndigital.com**). At roughly $1.31 per gigabyte, the 7200rpm, 8MB cache WD800JB model is a steal.

Yes, cheaper drives can be had. But if you were to buy, for example, the 5400rpm, 40GB Western Digital 400EB ($80 street), you'd save just $25 while losing half the capacity to store video and music. You'd also be giving up rotational speed and an 8MB buffer. Western Digital's JB drives give you performance that's just a hair behind a top-of-the-line drive like IBM's 180GXP ($245 street, **www.ibm.com**).

Check it out: When we retested the 800JB using our updated hard drive benchmarks, the drive scored 161 points in *SYSmark2002's* Office tests. The class-leading 180GB IBM 180GXP did just a tad better at 165. That's so close, you'd probably never notice the 180GXP's speed advantage while working in real-world office apps. In *HDTach*, however, the results were more mixed. In both sequential reading and writing tests, the 800JB's 40GB platters were outclassed by the 180GXP's 60GB platters, falling behind by 5MB/s and 3MB/s, respectively. In *IOMeter*, the 800JB pulled 136 I/Os per second, but couldn't catch up to the 180GXP's 143 I/Os. That's no surprise, because IBM's performance under I/O-intensive operations (such as defragging) has always been strong. Still, Western Digital's 136 I/Os ain't too shabby. To put things in perspective, newer drives from Seagate and Maxtor have been hovering in the 125 I/O range.

Currently, 800JBs use two 40GB platters, but a single 80GB platter version should arrive sometime this spring. The upgrade will undoubtedly boost scores—possibly beyond the 180GXP's performance—while retaining the 800JB's budget price. If you're watching your wallet, but want speed and enough storage space to satisfy all but the most demanding video mulchers, the Western Digital 800JB will do you right.

| Benchmarks | WD800JB | IBM 180GXP |
|---|---|---|
| SYSmark2002 Office | 161 | 166 |
| HDTach average sequential read | 40.5MB/s | 45.5MB/s |
| HDTach average sequential write | 24.6MB/s | 27.7MB/s |
| HDTach random access time | 12.9ms | 13ms |
| IOMeter total I/Os per second | 136 | 143 |
| IOMeter average I/O response time | 469ms | 448ms |
| Capacity | 80GB | 180GB |

When pit against the latest and greatest drives, the WD800JB still does OK. Best of all, it's only a hair more than 100 bucks.

## Optical Drives

### Spin control on a budget

If you want a high-quality but low-priced optical drive, then the name you're after is Lite-On (**www.liteonit.com**). One of the biggest manufacturers of optical drives in the entire world, Lite-On makes drives that consistently test as well as, or ahead of, higher-priced drives, in terms of both speed and features. In fact, many of the high-priced, brand-name drives you've been drooling over are actually rebadged or repackaged Lite-On drives.

So, if you want to save some major jingle, cut out the middleman and snag the Lite-On 48x at your neighborhood PC megastore, or through an online reseller. At press time, the price for the 48x 48126S was hovering around $40, and this price may drop further as Lite-On's 52x burner becomes more widespread. While the MSRP for the 52x drive is merely $65 (the street price should be about $55), we still think the 48x burner is a better deal. The very most you'll get for your additional $15 is 30 seconds less time required to burn a full CD—at best. The increase in read speed is nominal; you won't really notice any dramatic improvement.

If you're determined to buy an even lower-priced drive, there are three critical features you should insist on. The first is some form of buffer-underrun protection, which ensures your drive receives a steady stream of data during disc burning, so that you'll never burn a toaster. Second, drives faster than 40x should advertise some kind of vibration dampening mechanism. Without vibration absorption, even the slightest imbalance at high-speed reading and writing will cause the drive speed to throttle down on you. Third, the big "gotcha" endemic to cheap drives tends to be slow and sloppy digital audio extraction. So, if the box packaging doesn't brag about high-speed digital extraction, don't expect to get it.

**BUYER'S TIP:**
Lite-On drives come bundled with our favorite burning app, Ahead's *Nero*, which at $69 retail, costs more than the drives themselves! Be aware, however, that these "OEM" versions of the software will only work with the specific drive model that they are bundled with.

**It's not going to be the prettiest thing in your PC, but Lite-On's 48x CD burner is one of the most attractive bargains you can find.**



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# Soundcards and Speakers

## If you want to save a bundle on your sound system, listen up!

It's no secret that we love Creative Labs' new Audigy 2 Platinum, but we understand that not everybody wants to lay down $230 for a soundcard. So what's the budget alternative? We first thought about Philips' Acoustic Edge, which has been a long-time favorite of the staff, but in the end we realized that once Creative Labs raised the bar to 24-bit audio, we could settle for nothing less.

The cheapest way to get 24-bit audio is in a "white-box" Creative Labs Audigy intended for resale by system vendors. That's right. Some PC stores offer products not only in pretty, shrink-wrapped packaging, but also in bare packaging that includes the soundcard and software bundle, but none of the retail flair.

We found white-box Audigy cards for $50 at several online stores. While buying an OEM videocard can leave you burning (because, for example, a vendor might sell a card with lower-than-expected clock frequencies), there's not much to muck up on a soundcard. Remember that the Audigy you buy includes a FireWire port and supports 5.1 sound, so it's pretty hard to go wrong with it. Just make sure you hang onto the original Creative Labs CD that comes bundled in, because the applications on the disc aren't available for download.

**BUYER'S TIP:** Headphones that sound great are much cheaper than speakers that sound great. If you're on a tight budget, go to Best Buy and listen to the $20 to $30 closed-ear headphones until you find something you like.

The best way to save money on a quality speaker system is to simply ditch the rear channels—2.1 rigs are much cheaper than 4.1 and 5.1 setups.

**Despite their small stature and low price, the PM9s are more than capable of cranking out big sounds.**

We're quite fond of Monsoon's Planar Media 9 flat speakers ($100, **www.monsoonpower.com**). Eschewing the traditional paper cone, the PM9s use a thin diaphragm and two electrically charged panels to create sound. Because the diaphragm is much lighter than a cone, the frequency response of the flat-panel speakers is very good. The downside to the flat design is that it's less than optimal for bass reproduction. But that's easily compensated for by the inclusion of a decent subwoofer.

# LCD Monitors

## Sure you want an LCD?

Let's be frank: We're not thrilled by the prospect of anyone buying a "budget" LCD flat-panel. For starters, the cheapest 18-inch LCDs (which offer about the same screen real estate as a 19-inch CRT) cost about $650. And if you want a 19- or 20-inch LCD (which offers about the same screen real estate as a 21-inch CRT), you'll be paying more than $1,000—not very "budget" in our book. Indeed, in a land where screen real estate reigns supreme, CRTs offer better value.

Besides their relatively high prices, LCDs also lack versatility. Namely, they run at just one fixed (or "natural") resolution, and this can have a profound effect on playing games. For example, if your LCD has a natural resolution of 1280x1024, you will *not* be able to play a game at 1600x1200—period. And if you find that your videocard isn't powerful enough to run a particular game at 1280x1024, and that you need to drop down to 1024x768, your LCD will "interpolate" the lower resolution at the expense of visual quality. Your formerly pristine, sharp pixels will look blurry and jaggy at the lower, interpolated resolution. For this reason, LCDs should give you pause.

They're fine in dual-monitor rigs, where you can still run a 21-inch CRT as your gaming monitor, but they just don't cut the horseradish as primary displays. (Note: If you intend to run a dual-monitor setup with one LCD and one CRT, it's best to go with similarly sized displays that can run the same resolution.)

Of course, if you *never* plan on running games, LCDs are A-OK. It's just that we know of very, very few *Maximum PC* readers who never, ever play games.

Now, assuming you're dead set on an LCD monitor, make sure your budget candidate has a DVI input (and that your videocard is DVI-ready as well). DVI is your ticket to a pure digital interface and is an absolute must for pristine, noise-free image quality. Also, if you want to save money, avoid LCDs with unnecessary input options (such as dual DVI), USB connectors, speakers, and crazy swivel and tilt controls. These features are all nice to have, but do jack up the price.

**BUYER'S TIP:**
We recommend that you only buy LCDs that you've actually taken out of the box and tested. Make sure your potential purchase bears no broken pixels, and no darkening around the screen perimeter.

**There's no reason to buy the Sharp L1820. It's pro features are overkill.**

All the LCDs we tested in our August 2002 roundup had more than sufficient pixel response to play video and 3D games without ugly trailing, streaking, and ghosting. Again, LCDs aren't ideal for 3D gaming, but if you can get past the fixed-res bugaboo, you should at least find that ghosting is a thing of the past.



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# ULTIMATE BUDGET UPGRADES

# CRT Monitors

## Buy big, buy aperture grille, and keep those refresh rates as high as possible

**Hey, the Sony E540 may be at the bottom of Sony's line, but it costs just $600, and 21 inches is 21 inches. We don't care what anyone says: Screen real estate reigns supreme. Bigger is better, end of story.**

We'd like to tell you exactly which display to buy, but the CRT monitor market is overflowing with options, and we've tested just a small percentage of budget monitors at *Maximum PC*, home of wretched high-performance excess. Consider: A quick perusal of Pricewatch.com reveals that no fewer than 115 separate companies are manufacturing monitors these days. By contrast, there are only *six* legitimate technology players in the 3D accelerator space—ATI, nVidia, Matrox, 3Dlabs, SiS, and VIA.

The upshot is that store shelves and online warehouses are absolutely sick with inexpensive CRT monitor choices, and we're just not comfortable making specific budget recommendations until we've tested the whole pack. We can, however, tell you what to look for when buying a solid, no-excuses CRT monitor at a good price.

First rule of thumb: Do not consider any CRT display smaller than 19-inches. Bigger is always better when it comes to screen real estate, and we feel that 15- and 17-inch CRTs are simply unacceptable for immersive gaming and running numerous open windows at the same time. Plus, even an extremely competent 19-inch CRT like the flat-screen Sony CPD-E440 costs just $370. That's about one-quarter the price of the $1,600, 21-inch Sony GDM-F520, our perennial pick for best display in the "price-is-no-object" category. Also, when you consider that the CPD-E440 gives you about 160 square inches of real estate at $2.30 a square inch, and that the F520 gives you about 200 square inches at about $8 a square inch, you'll see that you pay a premium for all of Sony's high-end, pro-level features.

This leads us to the second rule of thumb: Don't pay extra for controls, features, and a level of quality you may not need! For example, let's say you're dead set on a 21-inch CRT (wise decision; we've taught you well), and you want to buy a Sony because you're committed to buying Trinitron technology and all the vibrant color it offers. You now have three choices: the F520 ($1,600), the G520 ($800), and the E540 ($600).

The F520 sports a grille pitch of 0.22mm. The fine level of detail provided by this grille pitch looks magnificent, but might be overkill for anyone but a CAD illustrator. The F520 also supports 2048x1536 at 85Hz, and you just don't need such high resolutions and refresh rates for regular gameplay and desktop computing. Nor do you need the F520's BNC inputs and other pro-level accouterments. (Seriously, how often do you plan on adjusting your CRT's color convergence?)

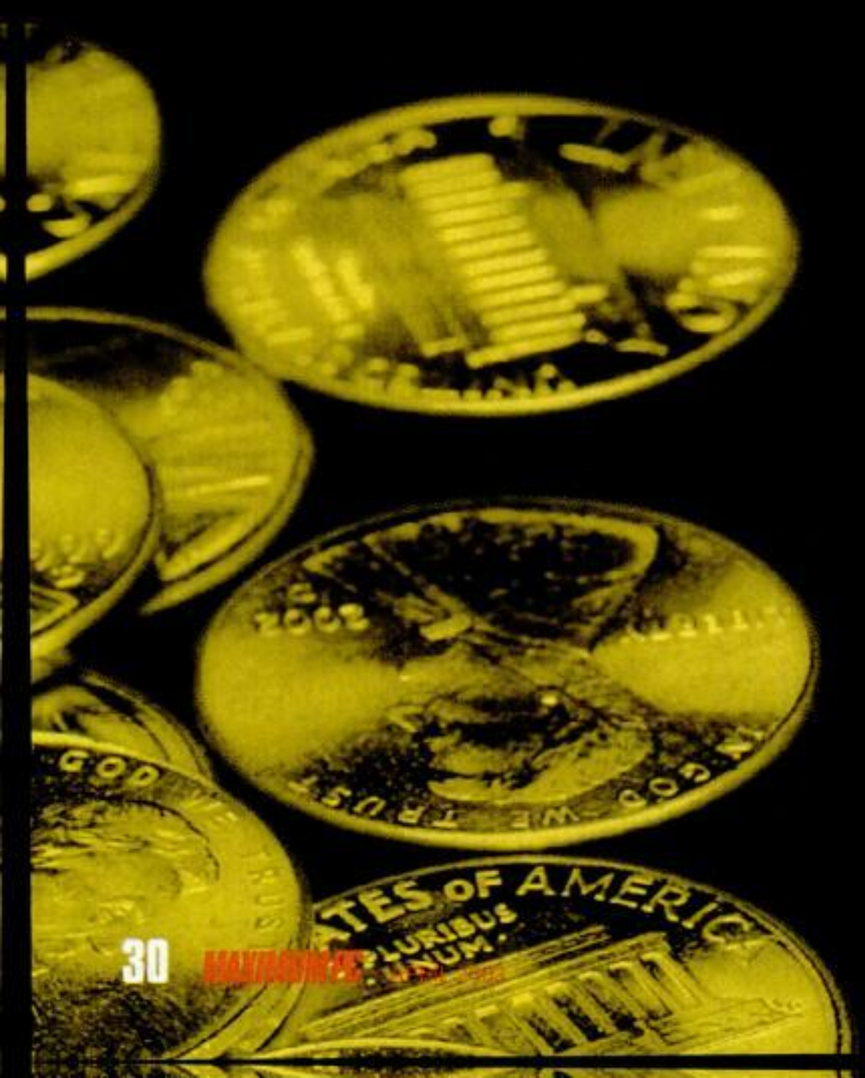
So, if you pay just *half* the price and get the G520, you get the same amount of screen real estate, the same screen flatness, and even the same 2048x1536 resolution. Sure, at 2048x1536, the G520 runs at a "mere" 75Hz, but how often do you plan on hitting 2048x1536? The G520's grille pitch drops down to 0.24mm—a bit coarse, but still quite acceptable—and the G520 also lacks BNC connectors and some other fancy features.

Finally, if you want to save another $200 by purchasing the E540, you get the same screen real estate, the same screen flatness, and even the 0.24mm grille pitch of the G520. But your top recommended resolution does drop down to 1600x1200. However, just like all the other 21-inch Sony CRTs, the E540 can hit 85Hz at 1600x1200, and this is all the refresh you'll ever need for seamless 3D gameplay (though not necessarily video-card benchmarking, where a low refresh rate can bottleneck your frame rates).

We must also note that all three of the 21-inchers discussed here include a three-year manufacturer warranty. And here's another little buying tip: Any time you see a CRT branded as having a Trinitron screen, you can rest assured it was built with Sony technology, so you might be able to save a few bucks by buying Trinitron in a "no-name" chassis. The same holds true for NEC-Mitsubishi's Diamondtron technology. Trinitron and Diamondtron technology are essentially identical, and give CRT displays superior brightness and color brilliance compared with more pedestrian shadow-mask technologies.

Bottom line: When it comes to CRTs, you pay a premium for stratospheric resolutions and refresh rates that you'll probably never need. To this end, we think an inexpensive, 21-inch CRT with either Trinitron or Diamondtron technology is the way to go. Just make sure it can hit 85Hz at 1600x1200, and offers a grille pitch no more coarse than 0.24mm.

Within the next few months, we'll be running a multi-page feature on 21-inch CRTs, and we expect to review six to 10 monitors in depth.





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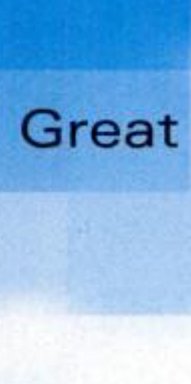
Great **players** never hesitate

to **pick up** their game

# or their case.

**It's Gaming on the Go with The New, Ultra Light Antec LANBOY Case**



Whenever. Wherever. That's your attitude when you're ready to play. And you don't need a case that will weigh you down. That's why the portable LANBOY is just for you. It makes getting to that next LAN party even easier with its lightweight aluminum body and a *free*, easy-tote carrying strap. And every LANBOY case comes with a blue LED-illuminated Antec power supply and a clear window side panel to give your gaming experience that extra edge. So pick it up today and take your game to the next level. That's *the power of you.*

To view our full line of products, visit us online at www.antec-inc.com

Antec
The Power of You

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# Budget Notebook Knockdown

## Can maximum enthusiasts be happy with today's cheapest laptops?

Three years ago, a $1,500 notebook was a "college student's compromise." Even relatively good budget jobs had horrible passive-matrix screens, and a built-in floppy drive was considered an extra feature. Well, those days appear to be over. Today's cheapies not only come well-equipped, they also boast some surprisingly lofty performance specs.

We wanted to test the new breed in person, so we called up a slew of notebook companies and requested their best mobile warriors for less than $1,500. Some companies balked ("Send a bottom-of-the-line notebook to those hardware snobs? Hah!"), and others declined because they were in the middle of product cycles. But in the end, we received two notebooks that cost $1,500, and a third that grazes the magical $1,000 barrier. These babies will never be mistaken for dream machines, and they're certainly not appropriate for LAN party gaming. But, truth be told, we were impressed with what they *do* offer. In fact, if we had decided to create a special verdict scale—one that weighed value over pure performance—each one of these notebooks probably would've earned a Kick Ass award.

### TOSHIBA 2415-S205

We were pleasantly surprised when the first of the group showed up. Toshiba's Satellite 2415-S205 is a solidly built notebook with design lines similar to the premium Satellite 5200 model.




We thought that with the $1,449 price tag, Toshiba would have done what other manufacturers are doing these days: Stuff a cheap, fast (and hot) 2.4GHz Pentium 4 desktop CPU into the notebook in order to save money and boost performance. But, no, Toshiba opted for a true-blue 2GHz Pentium 4M. This mobile version of the P4 costs about $100 more than its 2GHz desktop counterpart, but runs cooler and helps extend battery life by drawing less juice.

Besides boasting more CPU power than most of our readers have in their current desktop systems, the Satellite includes an Intel 845MP core-logic chipset, onboard Ethernet, a modem, and a 40GB hard drive. The Toshiba DVD-ROM/CD burner combo drive can burn CD-Rs at 16x, but it's outclassed by the combo drive in the $1,000 HP, which writes at 24x.

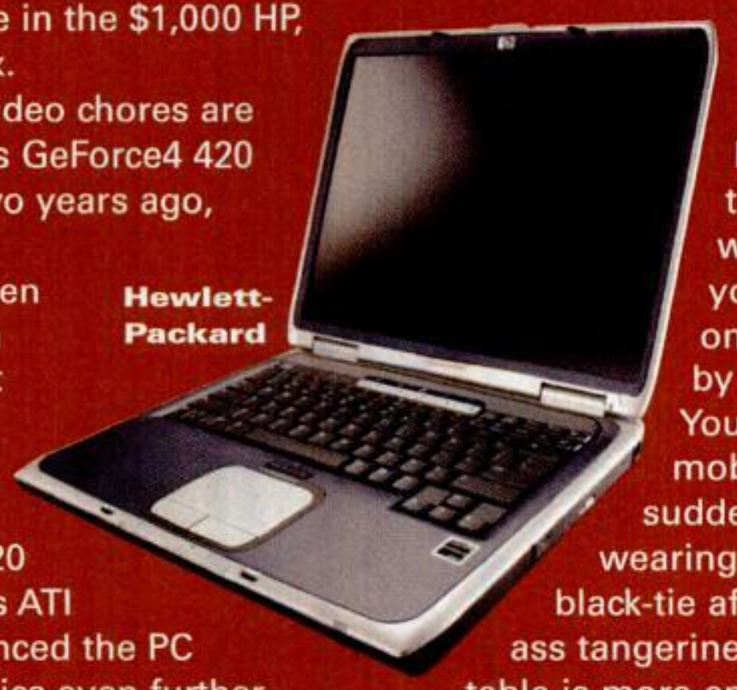
The Satellite's video chores are handled by nVidia's GeForce4 420 Go chipset. Just two years ago, you would have clucked like a chicken to get a GeForce in your notebook, but now it's standard fare in cheapo specials. In *Quake III*, the GeForce4 420 blew away the HP's ATI graphics, and trounced the PC Laptop's SiS graphics even further. Unfortunately, Toshiba hobbled the Satellite by opting for a petite 16MB frame buffer. This small size is fine for older games that don't use very large textures, but any game developed in the last year will choke. Still, we can see where Toshiba spent most of its cash: On regular-old application performance. Just note that the Satellite finished last in our DVD playback contest, draining its battery in 115 minutes (this, despite the P4M CPU).

The notebook itself feels extremely solid, and there's no noticeable flexing of the chassis or screen when the unit is moved or held. While we can forgive the lack of FireWire support and a high-res screen (the active-matrix screen looks fine, but its native resolution is just 1024x768), we firmly believe that any modern notebook should pack USB 2.0.

The Satellite is a performance winner, but an endurance loser. Truth be told, we'd like much more run-time, considering we'd never use this notebook for "real" 3D gaming anyhow. Still, overall it's a stable, solid product.

**MAXIMUM PC VERDICT: 7**
**$1,449, WWW.TOSHIBA.COM**

### HEWLETT-PACKARD ZE4200




You may have already experienced the pain of notebook humiliation: You're at the local coffee shop when you pop open your bargain jobbie only to be consumed by a feeling of dread. You look around at the mobile competition and suddenly feel like you're wearing blue jeans at a black-tie affair. Only the candy-ass tangerine iBook at the next table is more embarrassing. Well, if you buy the HP ze4200 for a smooth $1,000, your little secret will remain your little secret.

Outfitted with an Athlon 4 1600+ (1.4GHz) and ATI's IGP 320M graphics chip, the HP ze4200 doesn't suck. In fact, we're actually damned impressed with what this most modest of HPs has to offer.

For one grand, 1.4GHz is a lot of power. A 30GB Hitachi hard drive handles storage, and HP actually submitted the fastest optical drive of the roundup, a 24x DVD-ROM/CD burner combo drive. Nice. *Real* nice. We've never heard of the drive's manufacturer (QDI), but the drive worked well enough and was fairly quiet. HP also manages to include FireWire, onboard Ethernet, and a V.92 modem.

The notebook itself felt extremely



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solid, and its panels didn't flex or pop when pushed. Surprisingly, the ze4200 lasted an amazing 143 minutes on a single battery. That's longer than any other machine in the roundup, and good enough for the full playback of 85 percent of today's DVD movies.

The Athlon 4 1600+ certainly doesn't set any speed records, but it fared well enough against the pair of competing P4s, and isn't as severely underpowered as a pathetic Cyrix chip. For the most part, though, the Intel chips ran away with the benchmarks. The HP's gaming prowess is, well, "underdeveloped" to say the least. With an integrated ATI IGP 320M chipset, the ze4200 will pretty much limit you to lightweight games, or last year's shooters at low res.

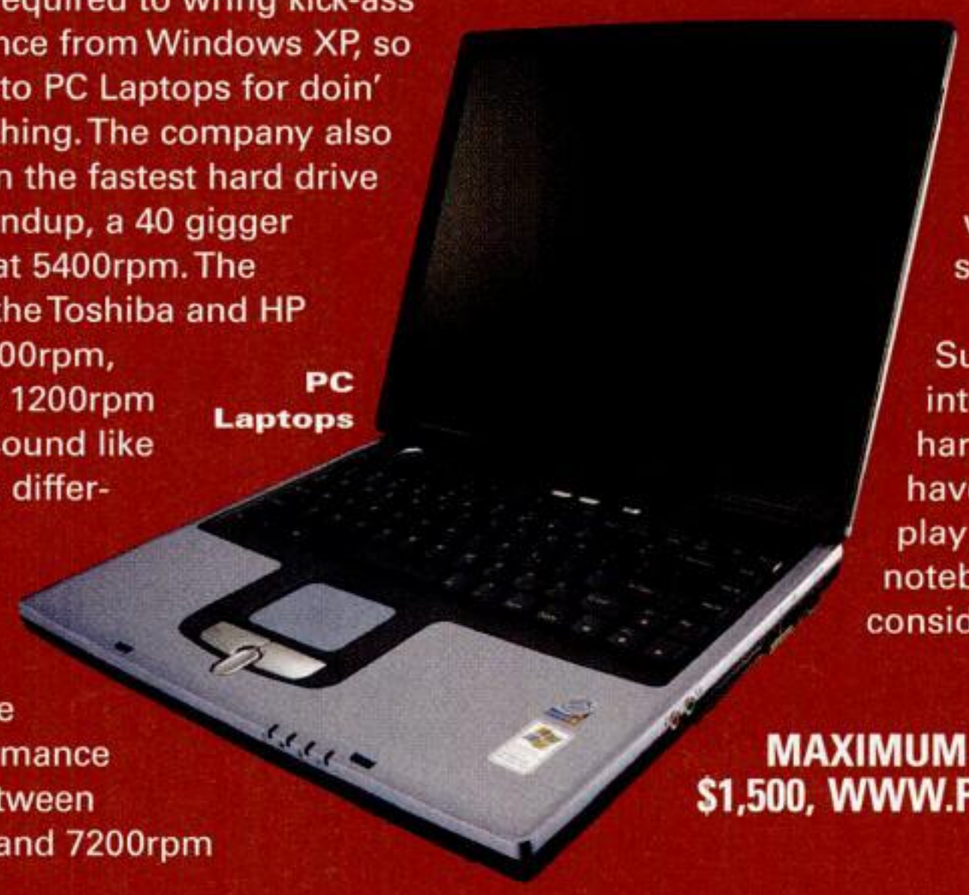
But, hey, let's put this sucker into perspective. At $1,000, the ze4200 practically qualifies as an impulse buy in the check-out line at CompUSA. If we were to buy this unit, we'd definitely add more RAM, and perhaps spring for an Athlon 4 with a little more clock speed. But if you're just looking for something on which to write short stories at Jammin' Java, it'll do fine.

**MAXIMUM PC VERDICT: 7**
**$1,025, WWW.HP.COM**

## PC LAPTOPS E-PRO SUPRA 255

When given a budget cap of $1,500, PC Laptops took some calculated risks. For starters, our E-Pro Supra 255 came with just a 1.8GHz P4M—the similarly priced Toshiba beats that by 200MHz. The Supra 255 also bears a wimpy core-logic chipset—the SiS 650, which also handles 3D acceleration duties (poorly).

But despite its two strikes, the Supra 255 is the only notebook in this roundup to boast 512MB of RAM. We consider this to be the minimum amount of memory required to wring kick-ass performance from Windows XP, so kudos go to PC Laptops for doin' the right thing. The company also plugged in the fastest hard drive of the roundup, a 40 gigger spinning at 5400rpm. The drives in the Toshiba and HP spin at 4200rpm, and while 1200rpm may not sound like much of a difference, we think it's significant. Sort of like the performance chasm between 5400rpm and 7200rpm desktop drives.




The final not-so-budget feature is an active-matrix screen boasting a resolution of 1400x1050—aka "SXGA+." The other notebooks reviewed here offer just 1024x768, and the difference is huge, considering how much more content you can comfortably display on the screen. The E-Pro Supra 255 also includes Ethernet and FireWire support, and a V.92 modem. You also get a *real* Windows XP Home install disc, instead of a restore disc.

On the performance front, the Supra 255's hard drive and 512MB of RAM gave the notebook a nice showing in the benchmark results, but 3D graphics performance was pathetic. The SiS 650's memory controller again proved weak in *SiSoft Sandra's* memory bandwidth test (we've seen this before).

The E-Pro Supra 255 is an interesting mix of hardware. If you have no plans to play games, this notebook must be considered.

**MAXIMUM PC VERDICT: 7**
**$1,500, WWW.PCLAPTOPS.COM**

| Laptop Comparisons | TOSHIBA 2415-S205 | HP ZE4200 | PC LAPTOPS E-PRO SUPRA 255 |
|---|---|---|---|
| CPU | 2GHz P4M | Athlon XP Mobile 1600+ | 1.8GHz P4M |
| RAM | 256MB DDR266 | 256MB DDR266 | 512MB DDR266 |
| Chipset | Intel 845MP | ATI IGP 320M | SiS650 |
| Screen | 15-inches/1024x768 | 15-inch/1024x768 | 15-inches/1400x1050 |
| Optical speeds | 16x CD-R, 10x CD-RW, 8x DVD-ROM, 24x CD-ROM | 24x CD-R, 16x CD-RW, 8x DVD-ROM, 24x CD-ROM | 16x CD-R, 10x CD-RW, 8x DVD-ROM, 24x CD-ROM |
| Hard drive | 40GB, 4200rpm | 30GB, 4200rpm | 40GB, 5400rpm |
| Price | $1,449 | $1,025 (with rebate) | $1,500 |
| QIII Demo 1 10x7 | 95.6 fps | 29 fps | 21 fps |
| Photoshop 7.0 | 77 sec | 78 sec | 62 sec |
| MusicMatch | 229 sec | 284 sec | 257 sec |
| DVD playback | 115 min | 143 min | 129 min |



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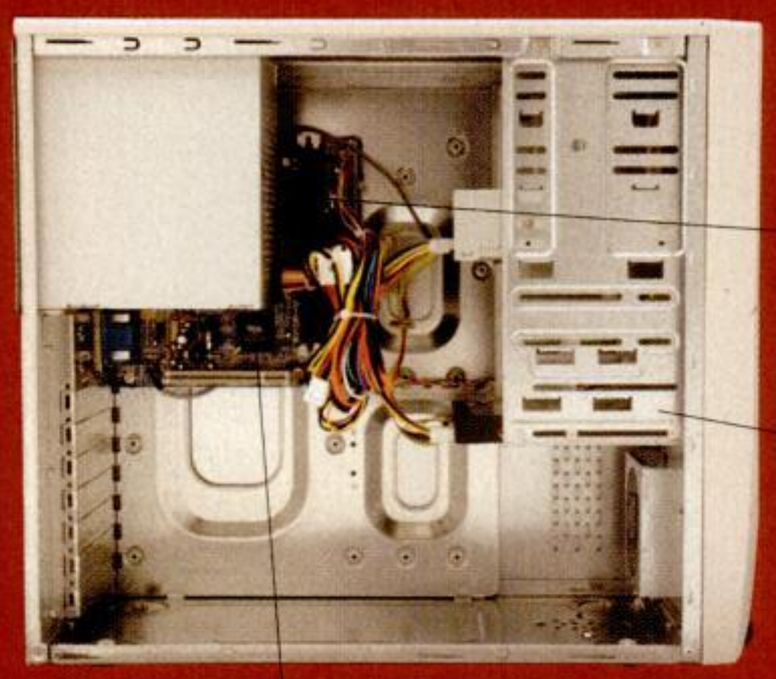
# ULTIMATE BUDGET UPGRADES

# Let's play... The Price Is Wrong!

## So, what *do* you get from a $200 Walmart PC?

The flipside of extreme, pedal-to-the-metal PC performance is severe, "it's-not-slow-enough-yet" PC retardation. Witness the Walmart Lindows PC, a disposable appliance if there ever was one. For a mere $200, you get a VIA E-Series 800MHz CPU and 128MB of PC133 SDRAM, all mounted on a Mini-ITX mobo with integrated video and sound. With components scraped off of the bottom of a time capsule, it may be the single-most underwhelming system we've ever tested. Nonetheless, it *is* able to perform the most rudimentary of PC tasks. E-mail, web browsing, and word processing apps are not only preinstalled, they're within the performance reach of the Lindows OS and its motley complement of hardware fools.



**The VIA C3 Ezra chip and EPIA-V motherboard put 1997 CPU power in a formfactor that's little larger than a CD.**

**The Trident Blade integrated 3D video takes its 8MB of video RAM from system memory, lowering total system RAM to a measly 120MB.**

**The 10GB, 5400rpm Maxtor Fireball is slow enough that it should be rebadged "slush ball." And even iPods have larger capacities!**

The full story on Lindows can be found at **www.lindows.com**, but the short story is that it's a cheapie, Linux-based OS that offers limited support for Windows apps. For example, you can't just drop in an *Unreal* CD and expect the installer to work. First, you'll have to install *WINE* (a free Windows emulator) to even stand a chance of getting your Win32 apps to run. But even then, cross your fingers. Windows support is iffy.

To benchmark the curiously frail Walmart box, we wiped Lindows and installed WinXP. The results screamed, "I just got my buttocks handed to me on a platter, whoopee!" The rig finished our *Premiere* test in 38 minutes and 40 seconds—nearly four times as long as our 2GHz P4 zero-point system. This came as no surprise, of course, because *SiSoft Sandra* rated the VIA CPU at about Pentium II 300MHz levels. Video performance was equally laughable. *3DMark2001* couldn't run because the machine's integrated Trident Blade video lacks the requisite 32MB of video memory (and of course has no pixel shaders).

Forget about backing up data to CDs when your 10GB, 5400rpm hard drive fills up, because the optical drive is a read-only 52x. And despite the abundance of expansion room in the Walmart case, the VIA Epia V motherboard has just one PCI slot, and no AGP slot. No monitor is included in the $200 config (would we really want one?), but we were surprised the machine lacked a modem and floppy drive. We know a lot of old ladies who think the floppy drive is the sexiest PC component, right after the reset button and the NumLock key.

We could diss its faults ad nauseam, but let's look at the machine's bright side. It costs just $200 and takes care of all your office tasks for the price of a WinXP Pro license alone. Cheapness, thy name is Walmart.

### UNDER THE HOOD

| | |
|---|---|
| **THE BRAINS** | |
| **CPU** | VIA C3 Ezra 800MHz |
| **Mobo** | VIA EPIA-V |
| **RAM** | 128MB PC133 SDRAM |
| **I/O Ports** | Two USB, PS/2 mouse, PS/2 keyboard, one serial, front, VGA, one line in, one line-out, one mic |
| **LAN** | Onboard 10/100 |
| **DISPLAY** | |
| **Videocard** | Integrated Trident Blade 3D 4X AGP (8MB shared memory) |
| **CRT** | N/A |
| **STORAGE** | |
| **Hard drives** | 10GB, 5400rpm Maxtor Fireball 541DX |
| **RAID** | N/A |
| **DVD-ROM** | N/A |
| **CD-ROM** | 52X MSI C52 |
| **AUDIO** | |
| **Sound chip** | Integrated AC97 2 channel audio |
| **Speakers** | The vaunted "$9 Multimedia Speakers" |
| **FINE DETAILS** | |
| **Case** | Generic 3-bay minitower, 300W PSU |
| **Fans/extras** | None |
| **Mouse** | Generic mouse |
| **Keyboard** | Generic keyboard |
| **Bundle** | Lindows OS 3.0 |

**BOOT: 1.49 sec.** **DOWN: 21 sec.**

| Benchmarks | 0-POINT | WALMART PC | PERCENT DIFFERENCE |
|---|---|---|---|
| SYSmark2002 | 205 | Would not run | NA |
| Premiere 6.01 (sec) | 615 | 2340 | Humorous |
| Audiograbber (sec) | 151 | 428 | Laughable |
| MusicMatch (sec) | 227 | 1486 | Downright funny |
| Jedi Knight II (fps) | 50.3 | Could not run | NA |
| 3DMark 2001 SE(fps) | 31.3 | Could not run | NA |

The zero-point PC includes a 2GHz P4, 512MB RDRAM, and a GeForce4 4600 videocard.



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# Ten Steps, No Regrets

Essential buying tips for the ultra-defensive online shopper

## 1 Choose the product, make and model

Let's say you want to buy speakers, like, say, that nice Dolby Digital 11.1 Acme system you saw reviewed in *Maximum PC*. Make sure you note the specific model number of the system, and check out what other people who already bought the speaker system are saying at **www.epinions.com**. You'll find a lot of extremely bitter ranting there, and an equal number of suspiciously exuberant product endorsements as well. Avoid basing your decision on any one review from any one source. Also consider other options available from a single company's cornucopia. For example, you probably don't need to spend $600 on *Photoshop* when Adobe's $150 *Photoshop Elements* has everything you need.

## 2 Check for the lowest prices

When hunting for bargains, the first place *Maximum PC* editors go is **www.pricewatch.com**. Here's where you'll find the absolute lowest prices for PC components sold online. Just be aware that the cheapest offer isn't always the best bargain. The most inexpensive deals are usually for OEM or "white box" versions of popular retail products. These parts are intended to be sold to system vendors, not individuals, and often don't include a warranty. Nonetheless, searching Pricewatch.com will give you a good idea of the going street prices and how they compare with MSRPs.

## 3 Pick a retailer, any retailer

This part is easy. Do you want to buy your component online, where you might score a great deal, or would you rather go for instant gratification at Best Buy or maybe a mom-and-pop computer store down the road? Big chains might be able to give you a good price, but you might have to deal with clueless, semi-conscious employees. The little shops, meanwhile, will almost always be able to help you with advice. And, of course, if you do decide to buy at a brick-and-mortar retailer, you can execute returns in a matter of minutes.

## 4 Check for gotcha's

Everyone knows to be wary of hidden fees when making purchases online. Here's a checklist to consider :

- Are the shipping prices reasonable?
- Does the retailer charge a restocking fee for returns? How much?
- What's the return policy? For example, can you send back an opened videocard box in the event the card's drivers won't cooperate with your system?
- If a product needs to be repaired, does the retailer pay for shipping one way, or both? If the product needs to be replaced, will you get a new one, or a refurbished product?
- Does the retailer have a customer service number? Dealing with e-mail support can be a time-consuming nightmare. At many sites, a customer service number can be harder to spot than the Loch Ness Monster. (Amazon's service number, by the way, is 800.201.7575.)

If you can't glean the answers to all these questions from the vendor's web site or over the phone, we say: Avoid at all costs (literally).

## 5 Check out the reseller ratings sites

Everyone knows about Amazon.com—it's probably one of the safest online retailers you'll ever do business with. But what about Happy PC Trader, Inc., or Gorgonzola Bros. Component Supply? You can learn details about their business practices at **www.resellerratings.com**. Just remember to look for patterns, and not give too much credence to any single individual review. Do people consistently complain about getting screwed over, or are they positively aglow about friendly service? Let general trends be your guide.



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## 6 Check the company's privacy policy

Virtually every online retailer wants an e-mail address in order to contact you if something isn't in stock, for example, or to offer you promotions in the future. But before you give up your addy, check the site's privacy policy. Does the site "share" (read: sell) your e-mail address and/or purchasing information with others? Can you "opt out," in other words, decline to have your e-mail address and demographic information given away to others?

Never give any retailer your top-level e-mail address, if you have more than one. (And you should have more than one.) If you give away a top-level e-mail address, your mailbox may soon be littered with crap that increases logarithmically as your address is sold from one marketer to another.

## 7 Check for site security

Before you submit any personal or credit card information, look at the bottom of your browser window. Do you see a lock or unbroken key at the bottom of your browser, with the "https://" prefix in the address? This indicates the site is using a SSL (Secure Sockets Layer) connection, which encrypts data going to and from the retailer's servers.

We think the hysteria over using a credit card online is exaggerated. Frankly, we're far more fearful of gas-station carbon receipts. But if a company can't be bothered to initiate a secure connection, well, it shouldn't be taking your money.

## 8 Use a credit card

Remember that many debit cards double as credit cards, and what you really want to use is a pure credit card. Not only do credit cards tend to limit your liability in cases of fraud, they also sometimes offer extended warranty protections. Plus, if something goes awry and Chechen rebels begin siphoning your account for fun money, wouldn't you rather have them drawing from a large credit institution instead of your personal checking account?

American Express card holders can also take advantage of Private Payments, which generates a unique number every time you shop. All you have to do is visit AmEx's web site first. Like Kleenex, these numbers are for one-time use only.

Visa cardholders have a free program called "Verified by Visa" that allows you to select a "personal message" and a password for your card. Each time you enter your credit card number while shopping with a participating retailer, you'll see a dialog box with your personal message. Once you acknowledge the personal message you signed up with, you enter your password for authentication.

Today's banks and credit institutions are in fierce competition, so check with yours. You might be surprised at the protections you already have as a member.

## 9 Print out receipt with order number

Sure, you're shopping at a virtual store, but you should treat it like a real one. No one would walk away from a real store without a receipt. Online prices can fluctuate, so having a printed receipt provides proof of the purchase price you agreed to.

## 10 Sic the bank on bad retailers

Check the contents of your package immediately after receiving it, preferably before FedEx even leaves the premises. Photograph damage, if any. And if you never receive what you paid for, or it's been more than a month with no message or refund from the retailer, call your credit card company immediately and talk about your options. Your card company can act as an intermediary. Until you've paid your balance, it's their money on the line, and they can "charge back" the amount to the retailer if you can prove fraud. ■


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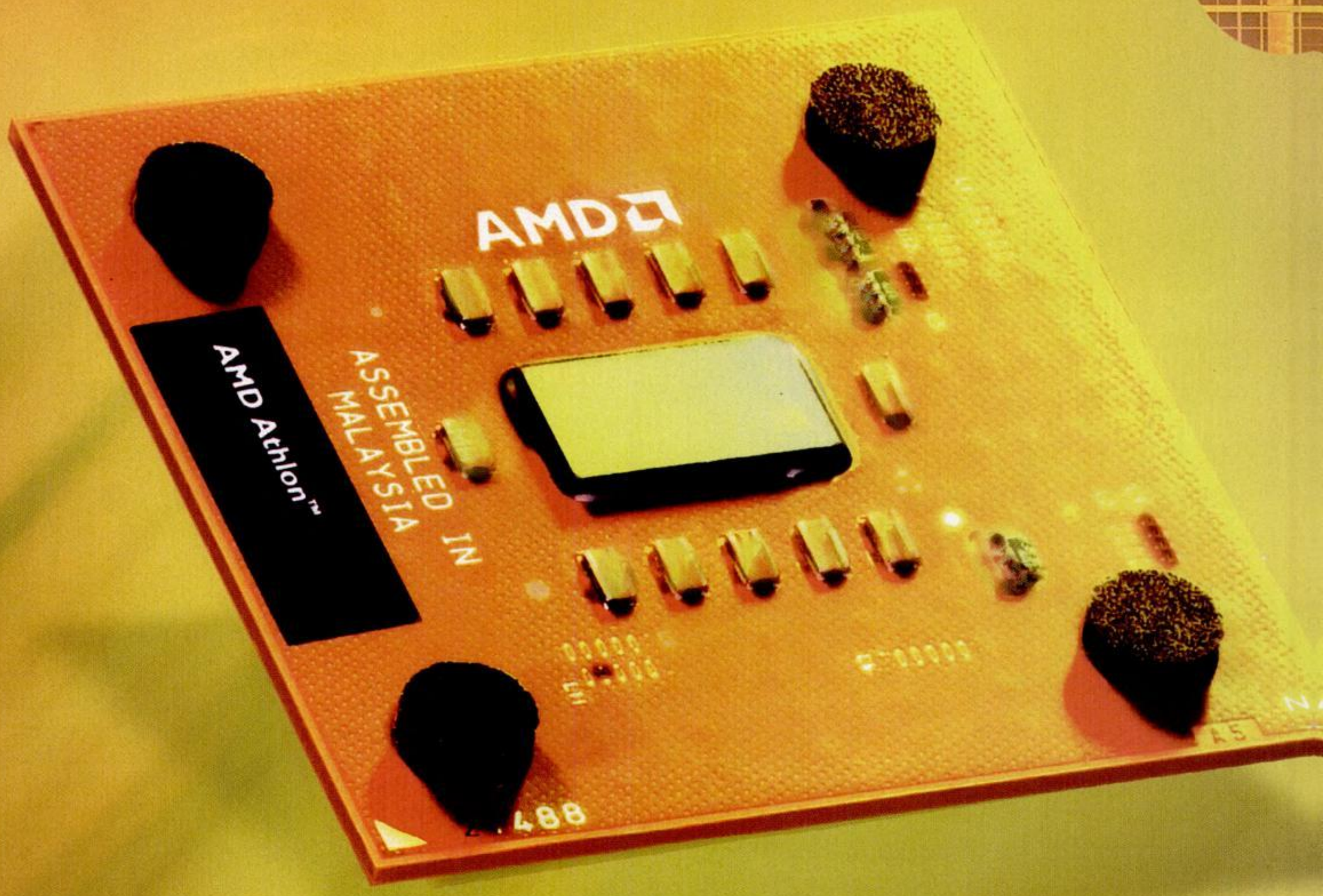


# BARTON RISING

**AMD's latest desktop processor offers all the performance of Intel's fastest Pentium 4. Here's everything you need to know about Barton and how it figures into your upgrading adventures...**

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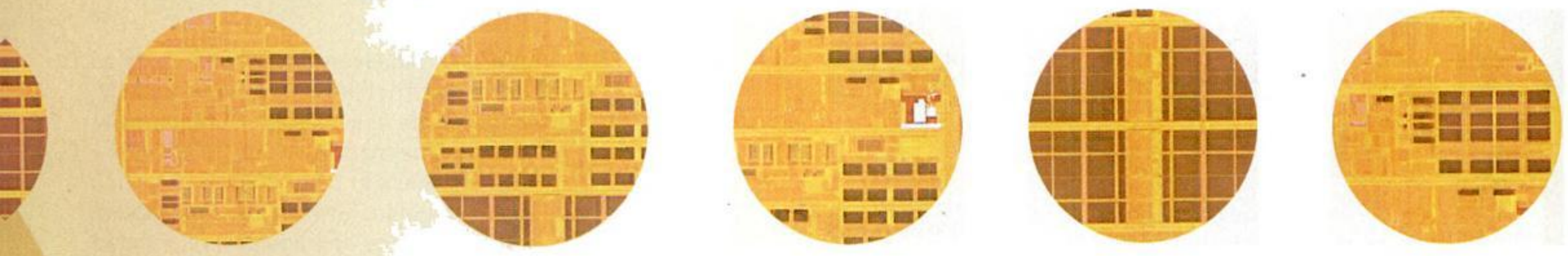

**In last month's "Speed Trials" cover story, we introduced you to the latest iteration of the Athlon XP processor. The chip, code-named Barton, bears a 3000+ performance rating and does indeed match the performance of Intel's 3GHz Pentium 4. Score a point for AMD, because until the arrival of Barton, the company's performance ratings never really matched up with the clock frequencies of the Intel competition.**

**AMD was able to finally achieve performance parity by introducing another 256K of L2 cache to the basic Athlon XP "Rev B" core. Throw in AMD's incredibly efficient, floating-point lovin' architecture, and you have a direct challenge to the Intel throne. This is pretty amazing considering that the Barton 3000+ runs at a significantly lower clock speed than the Pentium 4.**

**With the arrival of Barton, the fastest Athlon XPs now sport a grand total of 512K of L2 cache (the same amount as the P4). Interestingly, clocked at just 2.167GHz, the Barton 3000+ actually runs at a *slower* clock frequency than the Rev B 2800+ that we featured in November 2002 (that chip ran at 2.25GHz). Barton's larger L2 cache is what propels the new chip to higher performance ratings.**

**Interested? You should be. Read on for the full 411 on Barton upgrading...**

**—BY GORDON MAH UNG**

## Q: What does the code-name mean?

**A:** These days, all of AMD's processors are code-named after horses—Palomino, Morgan, Thoroughbred, and now Barton. AMD initially used the names of World War II fighter planes (Spitfire and Mustang), and then later opted to code-name its chips after cars (Thunderbird). As luck would have it, Spitfire and Mustang are the names of both fighter planes *and* cars!

## Q: How does an Athlon XP 3000+ compare with a 3GHz P4?

**A:** Both chips have their strengths and weaknesses depending on the software you run, but during last month's "Speed Trials," we found that the Athlon XP 3000+ achieves parity with the 3GHz P4, despite a massive core clock-speed disadvantage (shoot, even AMD's system bus is 200MHz slower than Intel's). You can check last month's feature for details, but in a nutshell, the 3000+ emerged victorious in *3DMark2001*, *Photoshop 7*, and *Premiere 6*, while the P4 took *Quake 3*, *Comanche*, *SYSmark2002*, and *MusicMatch*. In *Unreal Tournament 2003*, the 3000+ was faster in the fly-by demo, but the P4 was faster in a bot-match demo.

Aging apps that use a lot of floating-point calculations appear to run best on the Athlon XP, while newer apps that are bandwidth-intensive or have been optimized to take advantaged of the P4, are faster on Intel silicon. Of course, Intel's Hyper-Threading technology does present a wild-card: If you typically run two CPU-intensive apps at once, you'll see the P4 take the lead.

AMD has set 3000+ pricing at $588 per chip. That's just a little less than Intel's $637 3GHz P4, and we're frankly surprised the 3000+ costs as much as it does. In the past, AMD has severely undercut Intel's prices.

## Q: How does Barton's extra cache provide a performance boost?

**A:** A CPU is a number-crunching machine. It looks for data and instructions, pulls them in, crunches them up, and then spits them back out. When looking for number-crunching fodder, the CPU first searches its on-die Level 1 cache (aka L1). If the data can't be found in L1, the CPU then looks in L2 cache. If the right stuff isn't in L2, the CPU then rummages main system memory, and then, finally, the hard drive. Grabbing material from L1 is like fetching it from next door. Grabbing it from L2 is like walking across the street. But getting information from main memory or the hard drive is like having to drive from New York to Los Angeles just to pick up a package! A larger cache that can contain more data and instructions greatly enhances the performance of a CPU. The computer *anticipates* the data and instructions that might be requested, and stores them in L1 and L2 for safe-keeping. Larger cache equals greater storage space equals faster performance. Simple.

This month's 3000+ Polywell system (page 62) finished our *MusicMatch* test in 180 seconds. A Polywell system that we reviewed a few months ago featured a 2700+ processor and required 235 seconds to finish the same test. That's about a 23 percent difference. But here's the kicker: The 3000+ and 2700+ run at the same clock speed, and


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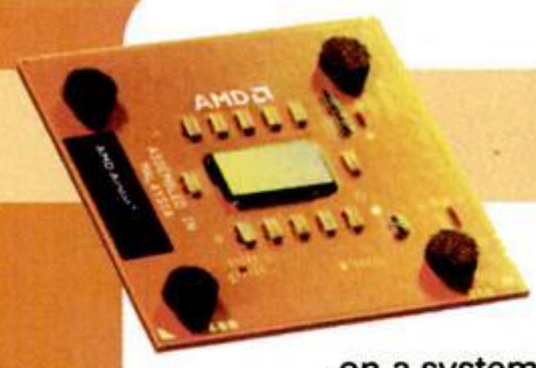


# Barton Rising

on a system bus of the same speed! The two CPUs really differ only in their respective amounts of L2 cache.

## Q: What other speeds are on-deck for Barton?

**A:** AMD says it will release a Bartonized version of the 2800+ running at 2.08GHz, and a 2500+ at 1.83GHz. The company also says a 3200+ is expected down the line, but won't comment on higher performance ratings. Assuming that the entirely new "ClawHammer" architecture will launch in September (more about this at the end of the article), we can guess that we'll see at least two more Athlon XP speed jumps before the 64-bit ClawHammer chip arrives. Of course, as we stated last month, we would've preferred to test a Barton chip running at AMD's fastest shipping frequency (2.25GHz), but as AMD told us, "We sell CPUs based on performance, not frequency."

## Q: When will Barton be put on a faster system bus?

**A:** We were disappointed when AMD launched Barton on the very same 333MHz system bus that was launched late last year. AMD, however, says that it's continuing to consider a 400MHz bus version of Barton (for use with the nForce2 chipset), but won't offer any specifics on when the faster bus might arrive.

Regardless, we think a 400MHz bus will arrive in short order. After all, AMD will have to respond to Intel's 800MHz P4 system bus, which is rumored to launch soon. AMD says it has no plans to release any 266MHz bus versions of the Barton CPU.

## Q: Will the 3000+ be as hard to find as the 2800+?

**A:** AMD and *Maximum PC* have different interpretations of the 2800+ rollout. AMD says the launch went off exactly as promised: That the 2800+ would initially be available only through OEM partners, and then be made available to individual upgraders in Q1 of 2003. It was our understanding, however, that individual CPUs for home upgraders were planned for release in Q4 2002.

If you're confused, don't sweat it, because it's all water under the bridge. AMD says you will absolutely be able to run out and buy an individual 3000+ chip by the time you read this.

## Q: What motherboard chipsets support Barton?

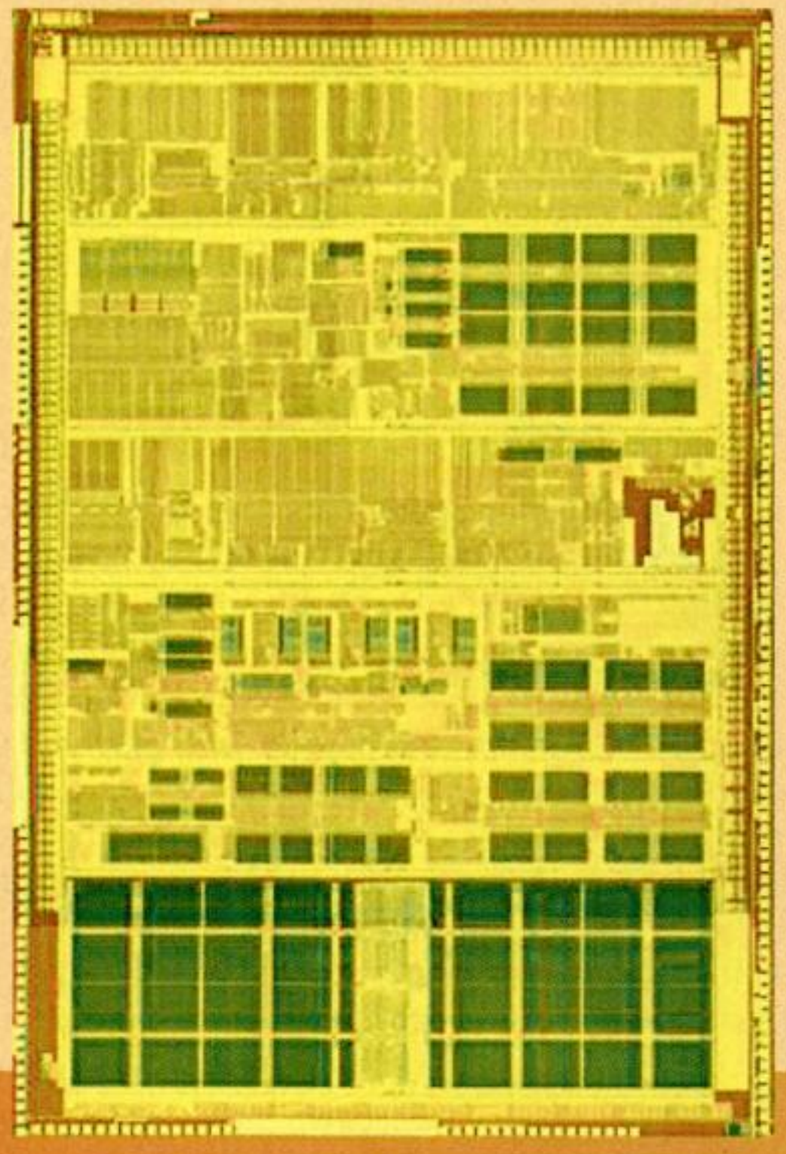
**A:** Although Barton plugs into the same Socket A interface that AMD has been using since the launch of the Thunderbird Athlon, you shouldn't expect automatic compatibility with any old motherboard. At press time, the only performance chipsets for Barton were nVidia's nForce2 and VIA's KT400. This is because Barton only rides the 333MHz bus, and only the KT400 and nForce2 support that bus speed.

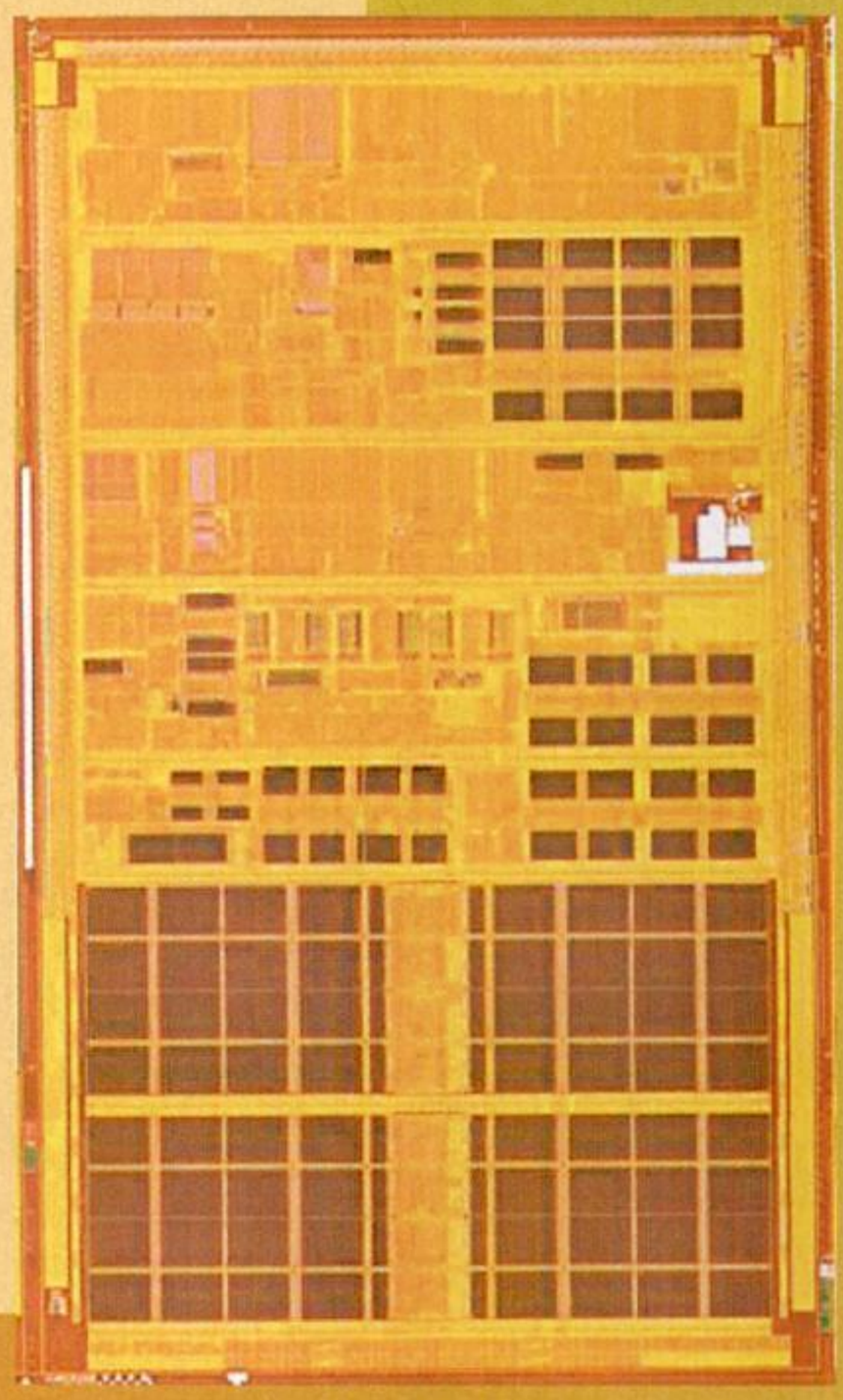
Although some motherboards with the KT333 chipset support 333MHz bus

# Two Die For

## Close-Up and Personal: AMD's Prettiest Procs

**Comparing new and old Athlon XP cores is like looking at housing subdivisions from an airplane. On the left, we have a smaller tract of land—the original Thoroughbred core. Note the two big green blocks that look like farmland. That's actual L2 cache packed into the chip. On the right, we have a physically larger piece of property—the new Barton core. Notice that the L2 cache has literally doubled in size. Some pundits posit that AMD couldn't squeeze much more clock frequency from the design, so it added more L2 cache to compensate.**







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speeds, not all do, so be careful. If you have an older KT333 motherboard, visit the manufacturer's web site to see if Barton is supported. It's also possible that by unlocking the Barton CPU, you'll be able to use it with an older chipset. But this practice is endorsed by neither AMD nor its motherboard partners.

## Q: What's the best chipset for Barton?

**A:** VIA's KT400 was our Athlon XP "chipset of the year" in 2002, but that's because it didn't have any competition when we were choosing our winners. Today, the nForce2 chipset—ripe with 128-bit DDR support—reigns supreme. We proved as much during our February 2003 motherboard testing: The Asus A7N8X featuring the nForce2 won *every* benchmark battle against the MSI KT4 Ultra and Soyo KT-400 Dragon Ultra, both KT400 boards. If you want more proof of the nForce2's superiority, consider that AMD recommends that journalists only test Barton with nVidia's chipset.

## Q: How was AMD able to put more on-die L2 cache on the Thoroughbred Rev B process? Did it have to "give up" other circuitry?

**A:** When AMD switched to its Thoroughbred B process last November, the company added another layer to squeeze more speed from its core. In other words, the chip was "built up." With Barton, however, AMD has "built out." The Thoroughbred B had 37.6 million transistors, but Barton has 54.3 million transistors. If you look at the images on page 40 comparing the Thoroughbred B with Barton, you can see that AMD literally doubled the cache in the die.

## Q: Is the Barton chip a direct swap for previous Athlon XPs?

**A:** If your motherboard and heatsink can handle an Athlon XP 2700+, they can likely handle the 3000+ Barton. AMD says one side-benefit of increasing die size is that the surface area of the chip increases accordingly, and this means more chip comes in contact with the heatsink. This extra contact is welcome, because the new CPU does run hotter than its predecessor. To wit: AMD says the 3000+ can generate about 74 watts of heat at maximum, while the identically clocked 2700+ hits 68 watts at maximum. (Please note: Typical heat generation is actually a bit lower at 58 watts for the 3000+ and 62 watts for the 2700+ and 2600+.)

To handle the extra heat, make sure your heatsink is up to the task (go to **www.amd.com** for a list of approved heatsinks). Barton's core voltage is actually the same as that of the 2700+ (1.65 volts), so any modern Athlon XP mobo that supports a 333MHz frontside bus should offer the right voltage support.

## Q: How will I know a Barton from a non-Barton?

**A:** With the extra transistors devoted to the larger L2 cache, the Barton appears slightly longer than the rectangular-looking die of the Thoroughbred, and is clearly longer than the square core of the Palomino. But the only surefire way to tell if you have a Barton is by firing up a utility such as *WCPUID*, and looking at how much L2 cache is reported, or by looking at the OPN number on the chip. See our sidebar on page 42 for more info on decoding OPN numbers.

## Q: Is Barton a good overclocking candidate?

**A:** Overclocking capabilities will be consistent with those of the Rev B Athlon XPs. Just don't make any wild assumptions about how far you can push the latest AMD chips. While certain batches of Rev B Thoroughbreds overclock like hell, many early batches do not. In our experience, we've been able to overclock the "B" by just two bin jumps.

## Q: What is the timeline for future AMD desktop chips? Should I pass on Barton in

# Current Processors At A Glance

| CPU Name | Athlon XP Thoroughbred B | Athlon XP Barton | Pentium 4 Northwood |
|---|---|---|---|
| Process tech | 0.13-micron | 0.13-micron | 0.13-micron |
| Transistor count | 37.6 million | 54.3 million | 55 million |
| L1 cache | 128KB | 128KB | 12K MicroOp |
| L2 cache | 256KB | 512KB | 512KB |
| Socket | Socket A | Socket A | Socket 478 |
| Die size | 84mm2 | 101mm2 | 146mm2 |
| Cache bus width | 64-bit | 64-bit | 256-bit |
| Bus speed support | 266/333MHz | 333MHz | 400/533MHz |


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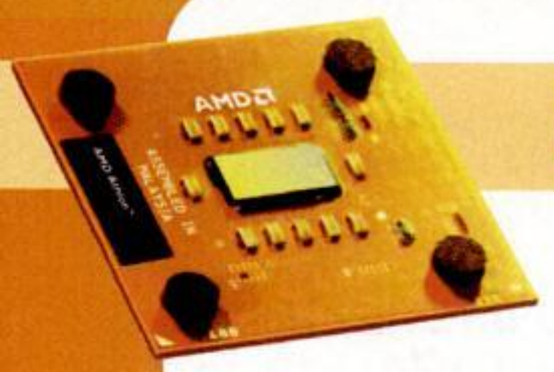

# Barton Rising

## anticipation of ClawHammer?

**A:** In a perfect world, AMD would have you buy Barton today, and then purchase Athlon 64 (aka ClawHammer) when it comes out later this year. But that's just not going to happen, is it?

In case you've been living in a bunker for the last two years, ClawHammer is based on AMD's x86–64 technology, and is a response to Intel's Itanium chip. When Intel introduced Itanium in May 2001, it broke away from the aging, 32-bit x86 architecture in favor of an entirely new 64-bit design. Unfortunately, no desktop apps and just a handful of server apps run 64-bit code. Itanium, meanwhile, is renowned for running 32-bit code rather slowly.

AMD saw an opportunity in Intel's dilemma, and designed a chip that promises 64-bit support with no 32-bit compromises. In fact, in past interviews, AMD told us that Athlon 64's 32-bit code support will pick up right where Barton leaves off. In other words, Athlon 64 performance will either equal or surpass Barton performance in desktop apps. And, of course, Athlon 64 will be able to address memory in 64-bit, and process 64-bit commands.

Athlon 64 was officially scheduled for the end of Q1 2003, but AMD has delayed the launch until September. Should you wait that long for a chip with unproven desktop performance? The Maximum PC 8-Ball says, "Too early to tell."

## Q: Umm, didn't AMD delay the launch of Athlon 64 before?

**A:** Yes. When the company launched the Rev B Athlon XPs in November 2002, it pushed back the release of Athlon 64 to March 2003. The latest news from AMD is that the desktop version of Athlon 64 will be pushed *way* back to September 2003, but the server version (named Opteron) will appear this month.

One AMD employee told us that the company decided it would make little sense to have Athlon 64 compete not only with the Pentium 4, but also with Barton. Furthermore, the company has acknowledged that it has had problems getting its Silicon on Insulator technology to scale with higher and higher clock speeds. And, of course, AMD also considered the fact that there are no consumer desktop operating systems supporting 64-bit code. Says one AMD rep: "(If we introduced it), we'd be forced to make the Athlon 64 run a 32-bit race. It's just not a smart decision to launch now, especially with Barton being as strong as it is."

## Q: Will the delay of Athlon 64 hurt AMD?

**A:** Perhaps so. If Athlon 64 is delayed well into September, it may well face a retooled Intel chip code-named "Prescott." This chip will use a 0.09-micron process, and run on an 800MHz bus. Prescott will likely be such a total revision, Intel may well call it "Pentium 5." Considering the vast amount of die real estate that Intel will get from moving to a 0.09-micron (90 nanometer) design, the company could possibly add huge amounts of cache, extra floating-point units (an area the P4 has always been weak in), and even multiple cores running Hyper-Threading. In short, Athlon 64 will have a tough road ahead when it goes toe-to-toe with Prescott.

## Q: Once Athlon 64 is released, will AMD give any more attention to the Athlon XP platform? Is Barton the end of the line, or will it possibly replace Duron?

**A:** AMD will likely transition the Athlon XP as a budget alternative to Athlon 64. The current budget Duron chip, already on its last legs, will be history. But because of the Athlon 64's delay, it's safe to say that Barton CPUs will be AMD's mainstay through 2003, and possibly into 2004 as well.■

# How to Decode Your AMD Part Numbers

**The number stamped on your Athlon XP isn't some random code. It's an AMD *ordering part number*, or OPN. It's also the key to unlocking a wealth of information about your chip—core voltage, package type, bus speed, and cache size.**

**Look at the tiny text in the black box on your chip; the OPN is the first sequence directly below the AMD logo. On our Athlon XP 3000+, the OPN is "AXDA3000DKV4D." The first four letters (AXDA) denote CPU core and brand name. The following numbers (3000) describe the model. In our case, the OPN says our 3000+ is an Athlon XP using a 0.13-micron process with a clock speed of 2167MHz. The "D" tells us our chip uses organic PGA packaging. The "K" denotes a core voltage of 1.65 volts; the "V" a max temperature of 185F; the "4" a 512KB of cache; and the "D" a 333MHz bus speed.**

**To determine the specifics of your OPN number, go to www.amd.com, and enter the term "OPN" into the search field. Hit the link titled "AMD Athlon Family Processor Socket A." This will load a PDF document titled "AMD Processor Recognition."**

**This file will answer all your questions.**



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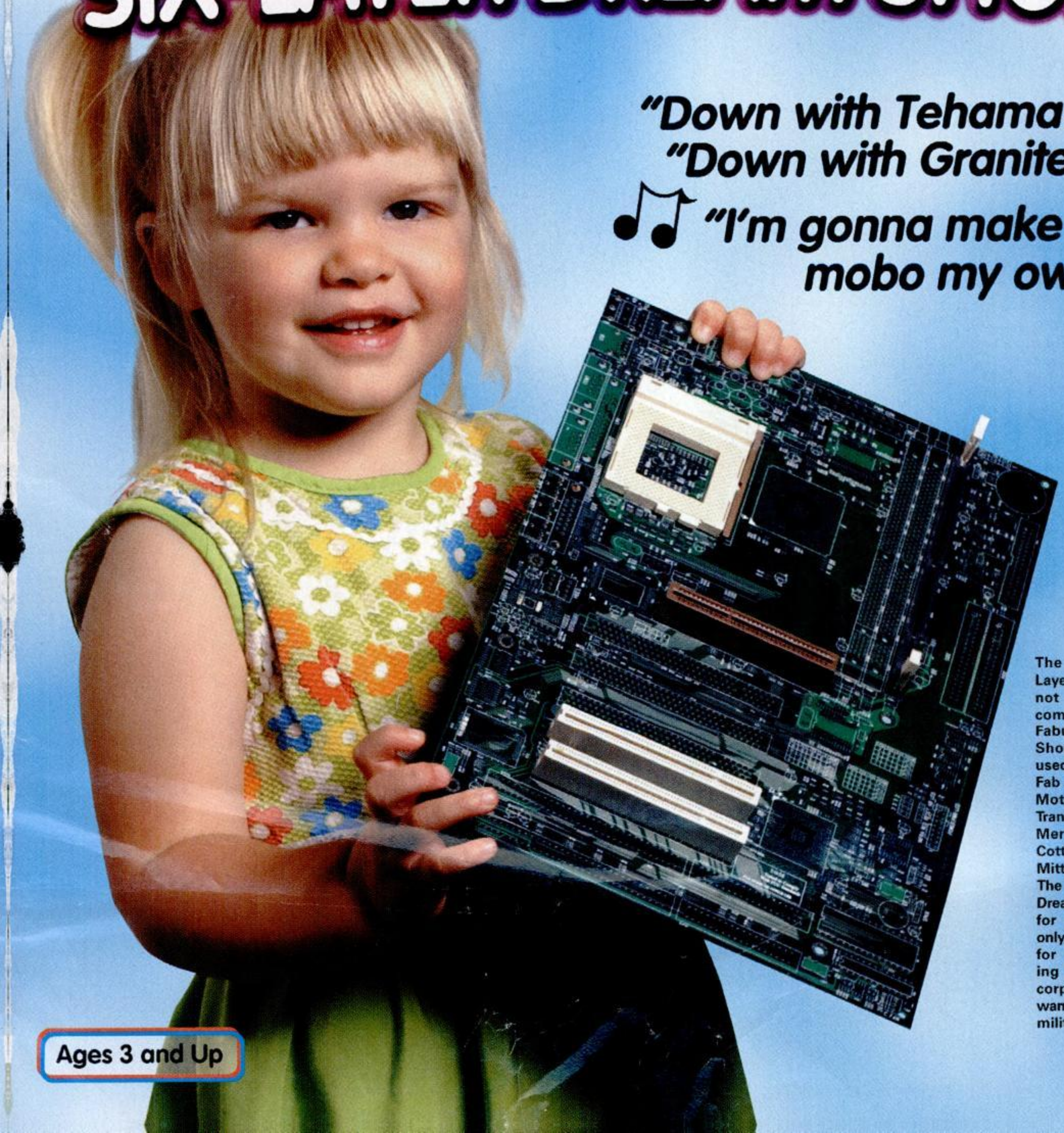

***"Down with Tehama!"***
***"Down with Granite Bay!"***
***"I'm gonna make a mobo my own way!"***

**Ages 3 and Up**

The Fab-Me-Fabulous Six-Layer Dream Shoppe™ does not support IEEE-approved components. The Fab-Me-Fabulous Six-Layer Dream Shoppe™ should only be used with My Lil' Mobo™ Fun Fab component kits including Mother Moxley's Old-Time Transitor Factory™, Miss Lady Merryweather's Core-Logic Cottage™, and Duchess Busy-Mittens EZ Inductor Oven™. The Fab-Me-Fabulous Six-Layer Dream Shoppe™ is intended for demonstration purposes only, and should not be used for mission-critical computing environments, including corporate file servers, early warning disaster systems, and military defense installations.

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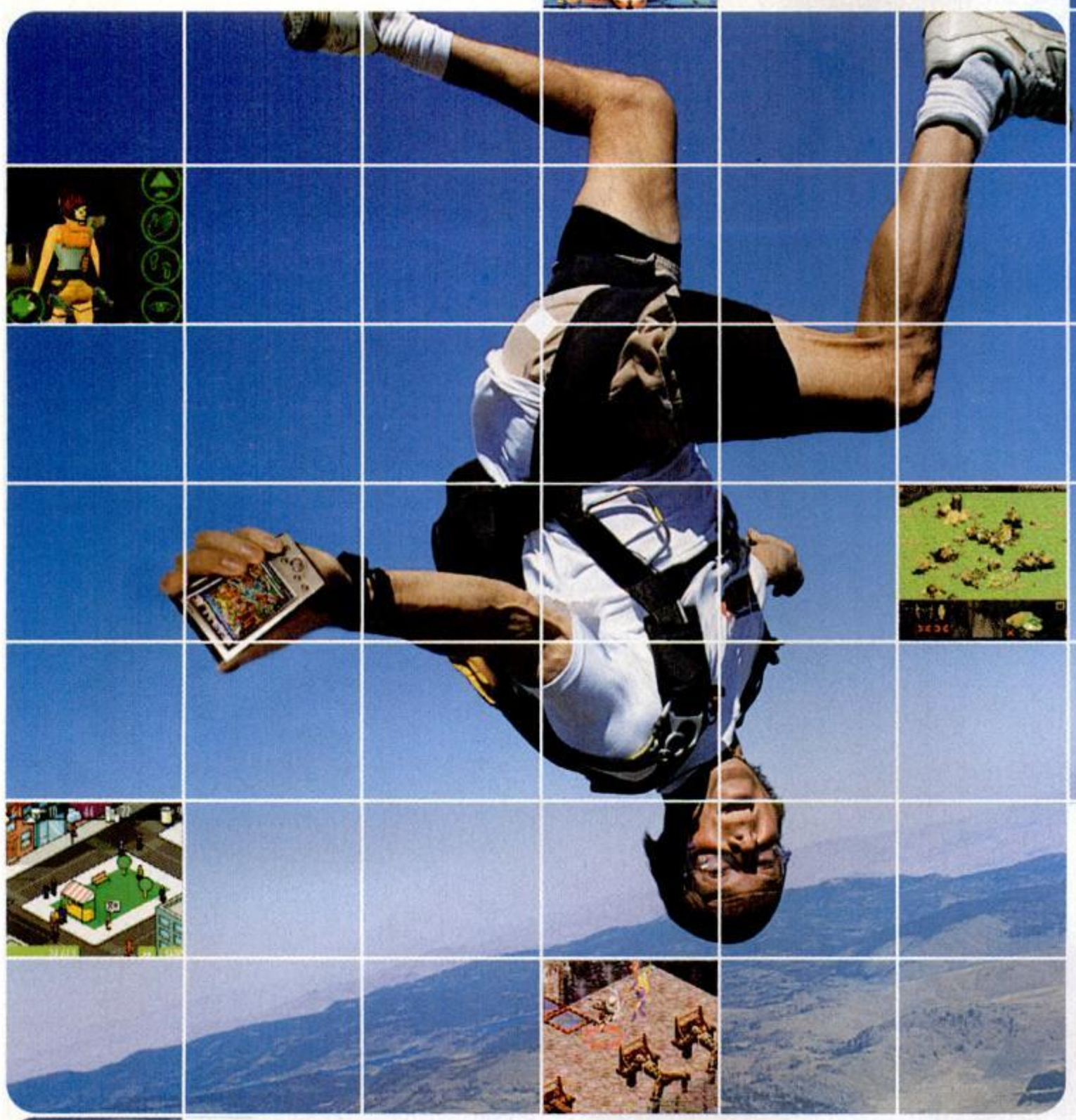

# FLIPPING OUT OVER HANDHELD GAMES

## We give you the best and worst of Pocket PC gaming

*Tomb Raider* on a handheld. Yes. *Tomb Raider* on a handheld. Nothing better exemplifies the rapid strides in PDA technology than the fact that the full-fledged 3D adventure game is now available in the palm of your hand. And La Petite Lara running at the Pocket PC resolution of 240 x 320 isn't some anomaly. The GameBoy Advance system has enough power to play games coded for the original Nintendo Entertainment System, so Nintendo is busy reissuing its beloved NES library in GBA versions with very little loss in quality.

The good news for PC enthusiasts is that the Pocket PC platform is following suit. Consider your Pocket PC to be the platform equivalent of, say, an early Pentium desktop machine sans 3D acceleration. PC game publishers are digging deep into their backlists to license off titles to small developers and publishers for conversion to Microsoft's handheld OS. Thus, we get *SimCity 2000* and *Age of Empires*, and, of course, Lara Croft in all her pixelated, buxom glory.

But the current Pocket PCs are ultimately not GameBoy killers for a very simple (and ultimately fixable) reason—control. "The control issue is an exceptionally frustrating one," says Mike Wagstaff of Pocketgamer.org. "On virtually all modern Pocket PCs, the joypad is located centrally rather than on the left, which might be better for aesthetics and left-handers, but not good for gaming."

Because Pocket PCs were designed to be slim and geared for business use, they don't have the fine controls of a game-only machine. The buttons are rigid, hard, and not particularly responsive. The directional pad lacks precision. The two buttons required for the simultaneous dual-button presses essential to action gaming are only now appearing in newer models. This leaves the stylus as a fallback control option for many game developers, and sometimes using the stylus to trigger a button move can feel like no solution at all. The thrill of hearing the words "*Age of Empires* for handheld!" dims considerably when you're trying to command 20 1-centimeter-tall soldiers in a pitched battle using just a stylus. So, for now, we've found that simpler games fare better on the Pocket PC platform.

But Pocket PC gaming is poised to break out. Some very good games are already available, and the developers are becoming more experienced and confident with the OS and platform (which is, after all, just three years old). Titles like *Age of Empires* and *Spawn* have to struggle with hardware that wasn't designed to bear the brunt of frenzied gaming, yet they still show the amazing potential of the system. The Pocket PC is a toddler in the technology world. It's just now learning to walk, and already it's prepared to run. That's a sign that good things are in store.

On the following pages, we present you with a representative spectrum of what the Pocket PC platform has to offer gamers. Some are lovable, some are loathsome. But if you have a Pocket PC PDA, and you like gaming, you *must* give the better titles a whirl. And let's just state from the outset that all the music and most of the sound effects that squeak and burble from the Pocket PC range from mildly annoying to utterly unbearable.

**—BY THOMAS L. MCDONALD**



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## AGE OF EMPIRES

By shrinking a massive game like *Age of Empires* into a handheld, ZIO Interactive has done an admirable job of an impossible task. Such a feat is akin to stuffing an elephant into an envelope. It just wasn't meant to be, but ZIO managed to overcome many challenges in clever and innovative ways, creating a cramped but largely effective game.

Expecting the full range of control and playability options in a handheld version of *AOE* would be foolish—imagine controlling a

**Tiny screen, epic battles.**

real-time strategy game using a stylus and no right-click option. Now imagine it on a screen the size of a folded cocktail napkin. You begin to see the problem. But even with all these limitations, *AOE* is far more playable than you'd expect. Units are selected with the stylus, and moved with a stylus tap. Building is done with icons, and scrolling with the directional pad. On the whole, the control system remains workable, at least until the barbarians start pouring over the hill and you begin to feel like you're literally on the battlefield fighting not with a sword, but a plastic stylus.

Visually, the port is remarkably close to the original, recreating epic battles at land and sea, but the tiny viewing area makes it difficult to get a good sense of the action. Like the original, the AI and pathfinding are appalling. The biggest drag on the whole experience is the staggering memory load. At 25MB, it turns an average PDA into a dedicated *AOE* machine.

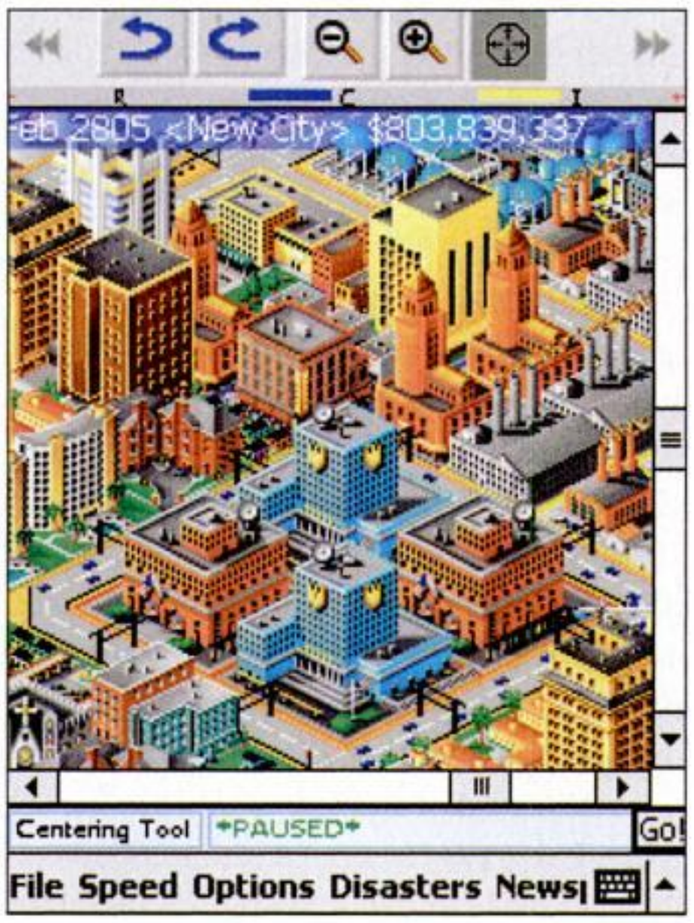
**MAXIMUM PC VERDICT: 6**

ZIO Interactive, www.ziosoft.com, $30

Install size: 8MB for the base game, 5MB for campaigns, 1.2MB for scenarios

## SIMCITY 2000

Like *AOE*, *SimCity 2000* comes surprisingly close to recreating the experience of the original. Everything from the 1993 game is here, including the terrain editor, underground water and subway networks, and even the cheat codes. It's also really, really tiny. The lack of clarity and fine control common to Pocket PC games affects *SimCity 2000* more than *AOE*, however.




**Finally, you can obsess over your city 24/7.**

The problems come down to precision and detail. It's not too hard to lay out residential, commercial, and industrial zones, although a slight tremble in your hand could convert most of the map to heavy industry. Placing individual structures is a little more ticklish, since the point of the stylus doesn't always land where you want it to. Roads and other long, straight things are even more challenging to place, turning your finished map into a lavish display of your stylus prowess.

Where the Pocket PC reduced the epic scale of *Age of Empires* to ant-farm proportions, it makes the complexities of building and managing a city even more difficult. Anyone who recalls the original *Sim* game will remember a plethora of buttons, tables, and functions. You had buttons for zooming, zoning, building, charts, and a wide array of other tasks. These have been concentrated in a multipart bar along the top of your screen, leading to a lot of scrolling back and forth that could have been better handled with effective use of the PDA's buttons.

When complex things get smaller, they get more complex. The process of reducing *SimCity 2000* to palm-size has doubled the workload for the game. Like many ports from PC to PDA, much of the pleasure of playing the game is replaced by the more dubious pleasure of playing the interface.

**MAXIMUM PC VERDICT: 5**

ZIO Interactive, www.ziosoft.com, $30

Install size: 4MB

## SPAWN

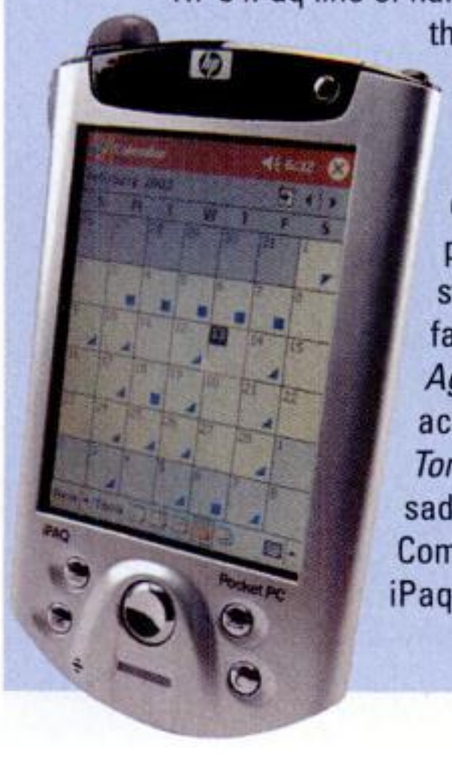
*Spawn* has all the potential joys and ultimate frustrations of handheld action gaming in a single package. As a primer on the problems of current Pocket PC design, it's priceless. As a game, it's simply maddening.

*see next page*

## THE IPAQ HP5400

**8 ounces of handheld gaming heaven**

All the games in this article were tested using HP's iPaq line of handhelds; specifically, the petit hp1910 and the brawny, bestial hp5400 (pictured here). The hp1910 didn't have any problem with the standard handheld fare, running even *Age of Empires* acceptably (but not *Tomb Raider*, which, sadly, will run only on Compaq-branded iPaq's). But it takes the muscle of the hp5400's 400MHz Intel XScale processor to run games with the I-can't-believe-it's-not-butter smoothness of a desktop machine. This goes *double* for emulated games. And even the hp5400 broke a frame-rate sweat trying to keep up with GameBoy Advance ROMs.



In addition to getting the fastest handheld CPU you can buy without a government security clearance, in the brawniest HP you get 64MB of SDRAM, a super-bright 240x320 TFT display, the same lithium-polymer battery technology that slims down Apple's iPod, and even Bluetooth and 802.11b wireless connectivity. Look for a full review in next month's issue.

## THE QPAD GAMEPAD FOR IPAQ

**Spare the gamepad, spoil the buttons**

It kind of goes without saying, but we're gonna say it anyway: Handheld PCs just weren't designed to handle the brutal button-mashing of an intense firefight, or the constant precision taps that you need in platformers. In fact, the Compaq iPaq H3600 series took a serious drubbing because, despite having the fastest

*see next page*



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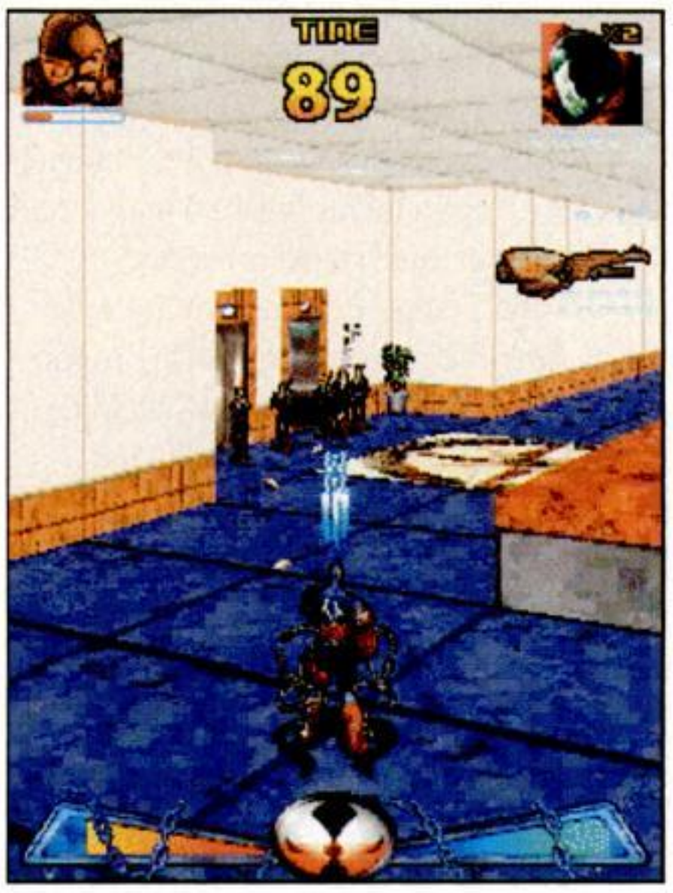
*continued*

Aside from its torturous control issues, the game content itself is quite decent. It's a fairly simple and effective third-person platform action game using Todd McFarland's comic book character Spawn. Other than the striking McFarland splash screens and the character itself, there's nothing particularly Spawn-like about the art or action. Like many superhero button-mashers, you could replace the lead character with just about anyone: Batman, Vin Diesel, Carrot Top, whomever. Spawn runs around a series of locations fighting wave upon wave of increasingly difficult enemies, with each level capped off by a boss fight. As you play, new moves and outfits become available. But, like many handheld action games, it follows a pretty shallow trajectory.




**Pray it doesn't spawn a sequel.**

What elevates *Spawn* to educational status, however, is a control system that would double nicely as an interrogation tool for the North Koreans. Spawn can strafe left or right, move backwards or forwards, or turn. Strafing? No problem. Back and forth? A snap. Turning? The Titanic turned better. You simply cannot turn in place. Period. And you can barely turn while running. Turns rely on a very narrow control point: about 11:00 and 1:00 on the control pad. With much, much practice, turning may be mastered by some, but you'll still wind up with sore thumbs. Stylus control is offered as an alternative to the directional pad. This is proof that at least someone at ZIO has a biting sense of humor.

**MAXIMUM PC VERDICT: 2**

ZIO Interactive, www.ziosoft.com, $30

Install size: 11MB

## POCKET FRITZ 2.0

Late last year, reigning chess world champion Vladimir Karmnick, aiming to avenge Garry Kasparov's humiliating 1987 defeat at the hands of IBM's Deep Blue, took on the commercial chess program *Fritz* in a highly publicized series of matches. In fact, a multiprocessor version of *Fritz* (dubbed "Deep Fritz") played Kramnik to a draw over six games.

*Pocket Fritz 2.0* is not that program.

Instead, Chessbase (the publisher of the leading chess programs *Fritz* and *Junior*) used another capable engine called *Shredder* to create the original *Pocket Fritz* in 2000. *Shredder* is a computer grand champion in its own right, and a strong chess brain, emphasizing positional play over tactical. With *Pocket Fritz 2.0*, Chessbase continues to enhance the core game with new features, focusing on annotation and analysis.

Since it presents such a strong opponent, Chessbase has added a number of options to customize the difficulty and power of the chess engine, including changing the size of the hash tables, adjusting play style, and otherwise handicapping a quite formidable computer brain. The database is extensive, including a large local selection of classic games, and online access to 2,000,000 others, plus a giant openings book via the Chessbase online database (all of this content is searchable by a diverse selection of criteria). Just about every aspect of *Pocket Fritz 2.0* is highly customizable, including the colors, board, pieces, and layout. It's the finest chess program for the PDA, and provides not only a potent challenge, but a fertile environment for learning.

**MAXIMUM PC VERDICT: 9**

Chessbase, www.chessbase.com, $50, Install size: 2.5MB

## EVERQUEST

As long as we're talking about games that aren't what their titles claim they are, let's

**Experience the humiliation of being outwitted by your handheld.**

*continued*

proc on the market when it debuted, the handheld couldn't recognize simultaneous button-presses. So you could run, or jump, but not run *and* jump.

But as a result of its own inadequacies, the iPaq H3600 got one of the best accessories for handheld gaming, Hanaho's QPad ($30, www.hanaho.com). Roughly emulating the layout of the Gameboy, the QPad not only recognizes multiple and simultaneous button-mashes, but it's also vastly easier to use, and somewhat more comfortable to hold than the iPaq itself.

Although its price seems steep to us, the QPad might pay for itself in the long run. A handheld's buttons will wear far sooner than those on dedicated gaming hardware, and likely be costly to repair. It's too bad, then, that the QPad doesn't fit the new generation of iPaq's from HP. Yet.

## MORPHGEAR EMULATOR

**Is that an arcade in your pocket?**

Using software to "emulate" a hardware system, emulators allow games created for proprietary platforms, such as arcade boxes or console systems, to play on other systems—primarily PCs. Emulators are fantastically popular with pirates, but they also allow gamers to resurrect old games from dead systems.

One of the best emulators for the Pocket PC is *MorphGear*, which doesn't bother to ask if you've paid for your ROMs (the games themselves), but does give you a very nice system for playing them. Formerly called *PocketGB*, *MorphGear* has, well, morphed into a one-stop emulation center, providing support for GameBoy,

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move on to *EverQuest* for Pocket PCs. It isn't actually *EverQuest*. It's *Diablo*. Or at least a reasonable mini-facsimile of *Diablo*.

*EverQuest*, as you'll no doubt recall, was a hugely popular 3D massively multiplayer online RPG. *EverQuest* for Pocket PC, on the other hand, is a not-nearly-so-popular 2D third-person top-down single-player dungeon hack. Not that there's anything wrong with that, and indeed there are *EverQuest*-y things in it like, well, um, the names of some of the places you visit.

Character creation has been reduced to Druid, Magician, Warrior, and Wizard, and the game's sole innovation is signing your

**Massively uniplayer handheld role-playing game.**

name with the stylus. Although there's no fine control over character creation, characters do advance, develop their statistics, and accumulate new spells as they wander the land—all while you're waiting for the screen scroll to catch up so you can click through text bubbles in order to kill the next monster.

Visually, *EverQuest* is quite strong for a PDA game, and the gameplay and control are actually done quite effectively, particularly considering the screen size. It's one of the few complex games that can comfortably be played entirely with the stylus. The experience is completely quest-based, with your single character venturing forth on errands for booty. Like *Diablo*, this gameplay may wear thin for some, because it lacks any real finesse. But taken on its own, its achievement in bringing a measure of RPG complexity and style to handhelds is quite remarkable.

**MAXIMUM PC VERDICT: 7**

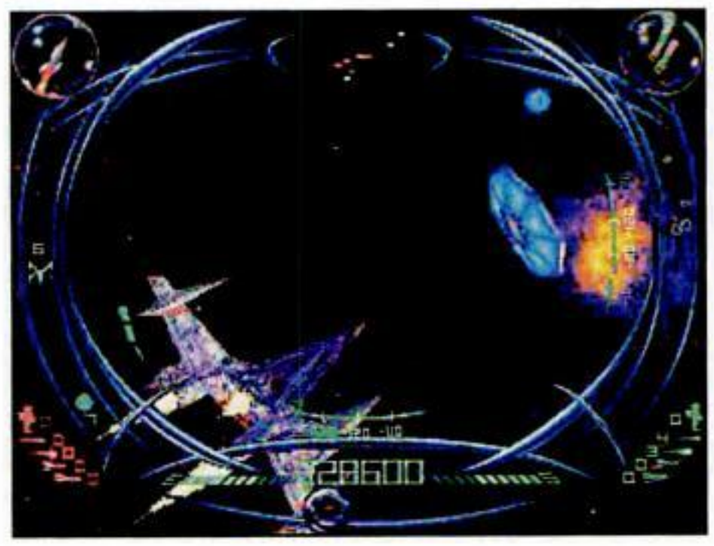
Sony Online Entertainment, eqpocket.station.sony.com, $20, Install size: 7MB

## DARXIDE EMP

*Darxide* is the game you'll use to show people how cool your Pocket PC is. The initial reaction is almost always the same: "Gee, I didn't know a handheld could do *that*.

"That" is a detailed, smoothly running 3D game environment with graphics that, while primitive by desktop standards, are positively revolutionary in a handheld. Created by Frontier (the people who did *Elite*), the game is a significantly enhanced and upgraded version of a title released for the Sega Megadrive 32X machine (and we're sure all 10 owners of that system liked the original quite a lot). Gameplay is nothing that breaks out of the box. Spaceship, space, things to shoot, things to shoot with, ship upgrades, next level, etc. There are 12 levels in all, providing a continuous stream of missions full of shootables.

The game is actually played in landscape mode (with the unit held sideways), allowing for a more comfortable and effective use of all the buttons. In addition, the buttons are customizable: a welcome feature that more developers should emulate. *Darxide* keeps




**Wow, things *are* better on the Darxide!**

on moving, looks great, and has enough diversity to make things interesting. It also demonstrates some of the awesome potential of handhelds to do 3D action games.

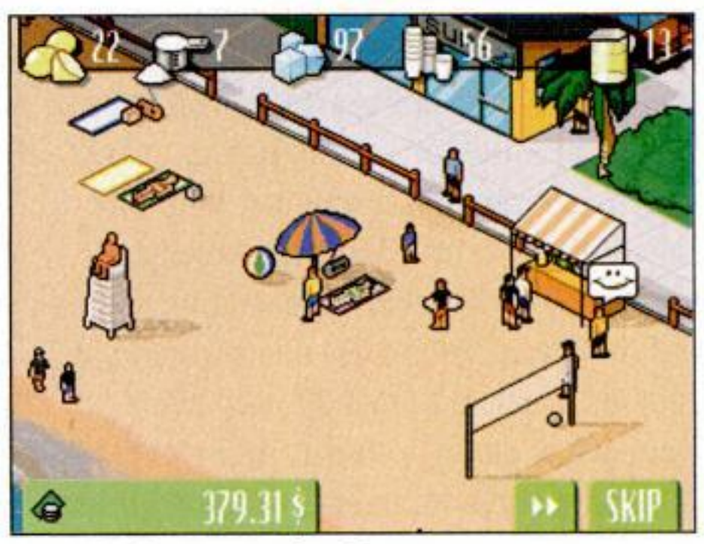
**MAXIMUM PC VERDICT: 8**

Frontier, www.frontier.co.uk, $20, Install size: 7MB

## LEMONADE INC.

*Lemonade Inc.* goes from clever to tedious in 30 minutes flat. While it's a colorful and appealing economic/management sim at first, you soon realize there's no *there* there. Building a lemonade business from the street corner up is a fun idea for a *Tycoon*-style game, and in fact many of the particulars are exceptionally well done. Finding a location;

*see next page*

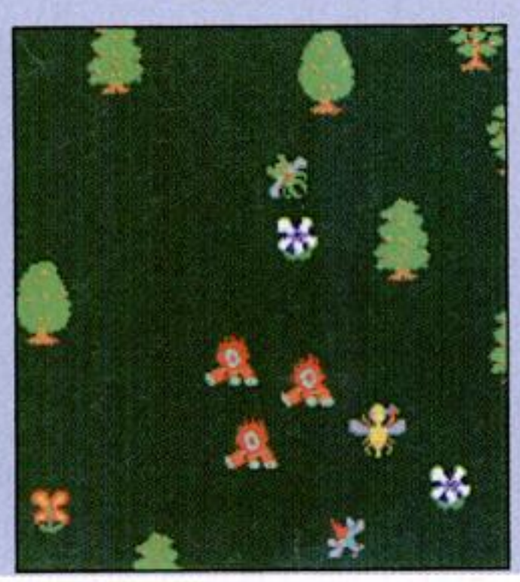


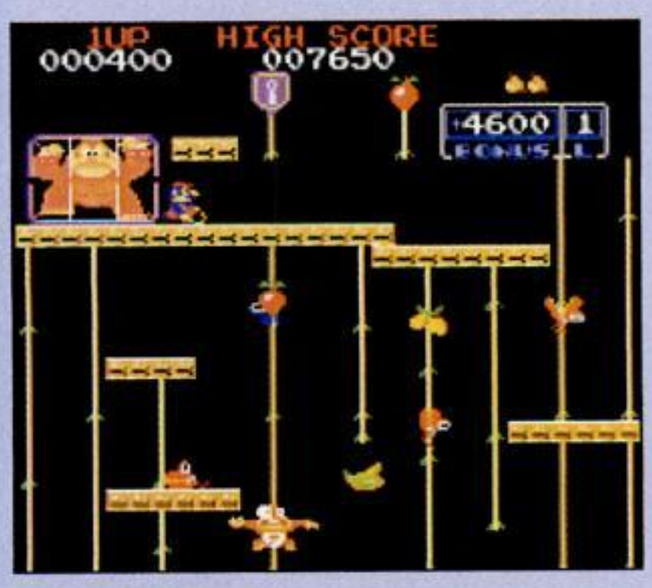

**Booth. Lemonade. Fussy customers. That's about it.**

GameBoy Advance, NES, SNES, Sega GameGear, Sega Master System, and NEC TurboGrafx-16. (Each system requires a separate reg key, attainable at www.morphgear.com for $20 each. There's a discount for multiple keys.)

The results are visually amazing, but the performance is often hit or miss. Obviously, the more modern the system you're trying to emulate, such as Nintendo's GameBoy Advance, the harder your Pocket PC will have to chug in order to emulate the operating system and draw the screens at the same time, resulting in dire frame rates and slo-mo action. We recommend sticking with the older classics.

Of course, if it's just old arcade games you're after, you can't beat the cool, classic flavor of *MAME*, the multiple arcade machine emulator (**www.mameworld.net/mamece3**). *MameCE3* is free, highly configurable, easy to use, and there are literally thousands of ROMs available on the net. Or so we hear.






**Emulation itself is not illegal. Ripping a game you've bought is not illegal. Downloading a rip of, say, *Metroid Prime* for GameBoy Advance from Usenet, is illegal. Really. Don't make us tell you this again.**



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*continued*

choosing ingredients; creating, testing, and modifying a recipe; selling lemonade to a picky customer base; and all the core elements of a good business game are done generally quite well and managed with a simple stylus control. But the game never really evolves the way many econ games do. Its core factors—stripped of their lemony trappings—amount to little more than massaging the numbers and moving to the next day. It has an almost Zen-like fetish for simplicity, and this ultimately works against the game's long-term playability.

**MAXIMUM PC VERDICT: 4**

Hexacto, www.hexacto.com, $20, Install size: 1.4MB

## HYPERSPACE DELIVERY BOY

Much to the credit of John Romero and partner Tom Hall, *Hyperspace Delivery Boy* seems almost like a type of penance, a chance for a couple of gaming legends to prove their deep roots in the most fundamental sort of gameplay.

And prove it they do. *Hyperspace Delivery Boy* takes some time to warm to, primarily because it involves quite a lot of backtracking, but its humor and charm become more obvious the deeper you get. Though it offers both puzzle and action modes, the differences are fairly modest, and the game rarely strays from classic top-down, puzzle-adventure style. The main character, Guy Carrington, has to collect letters, gems, and other objects, and then deliver them in order to solve levels and move on. This involves a lot of box pushing and (in the action mode) some very light combat. Throughout its 30-odd levels (all of them crisp, clean, colorful, and clever), the gameplay stays focused on clearing obstacles, avoiding traps and enemies, and completing the current task.

**Classic gameplay, and wisecracking NPCs from Romero and Co.**

These tasks pile up, since completing a simple delivery may involve an absurdist string of other tasks, but the game design is tight and easy to manage. It can be played entirely with the stylus, using a handy movement control to set paths through the environment by simple taps. From the ground up, this is a PDA game: not a PC port or GameBoy wannabe. It plays to the strengths of the format, showing that the stylus can be a perfect control device for a game designed with the stylus in mind. In a very real sense, Romero and Hall have come full circle, creating a game with some of the spirit of Id's first game, *Commander Keen*.

**MAXIMUM PC VERDICT: 8**

Monkeystone, www.hyperspacedeliveryboy.com, $20, Install size: 7MB

## TOMB RAIDER

Good Lord, where do we begin? There *she* is, in all her voluminous glory, delicately, um, reproportioned for the Pocket PC. No other game we've seen has pushed the hardware of a handheld PC so far (and with such success) as this complete replica of the original *Tomb Raider* for the PC. It includes the swimming levels and the initial tutorial at Ms. Croft's estate, and the only thing missing from the original are the cutscenes.

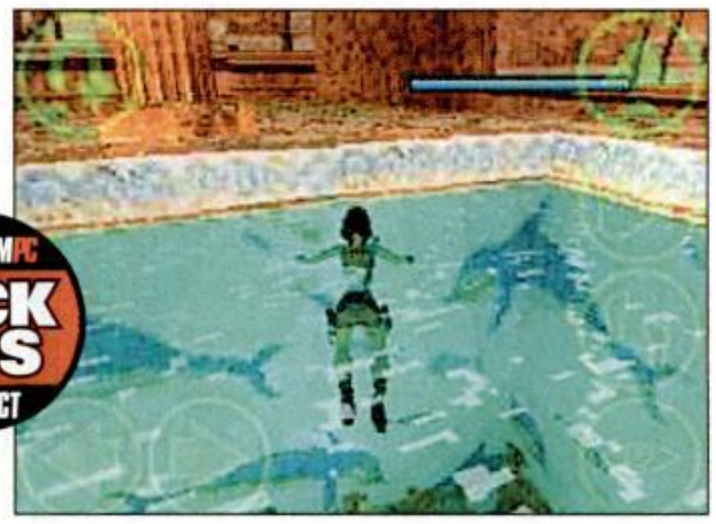
The game is played in landscape mode, and the default controls use both the stylus *and* some of the iPaq's buttons. You control Lara's direction and jumping with the buttons, while other routines, such as the sidestep, backwards roll, and firing are triggered by translucent buttons onscreen. It's very awkward at first and never becomes completely comfortable, but we did get used to it.

And good thing we did, as the lions, bats, and even the rampaging T-Rex come back for encore performances. We could have done without dying over and over again after ill-timed jumps, but hey, we said that about the original, too. The port is a technical achievement, and though our mantra has been that simpler is better in Pocket PC games, Eidos seems to be saying, "Oh, yeah—but how about *this*?"

Although the game is being offered exclusively through Handango, skeptics can grab the one-level demo at **www.tombraidertogo.com**.

**MAXIMUM PC VERDICT: 9**

Eidos, www.handango.com, $30, Install size: 10.5MB



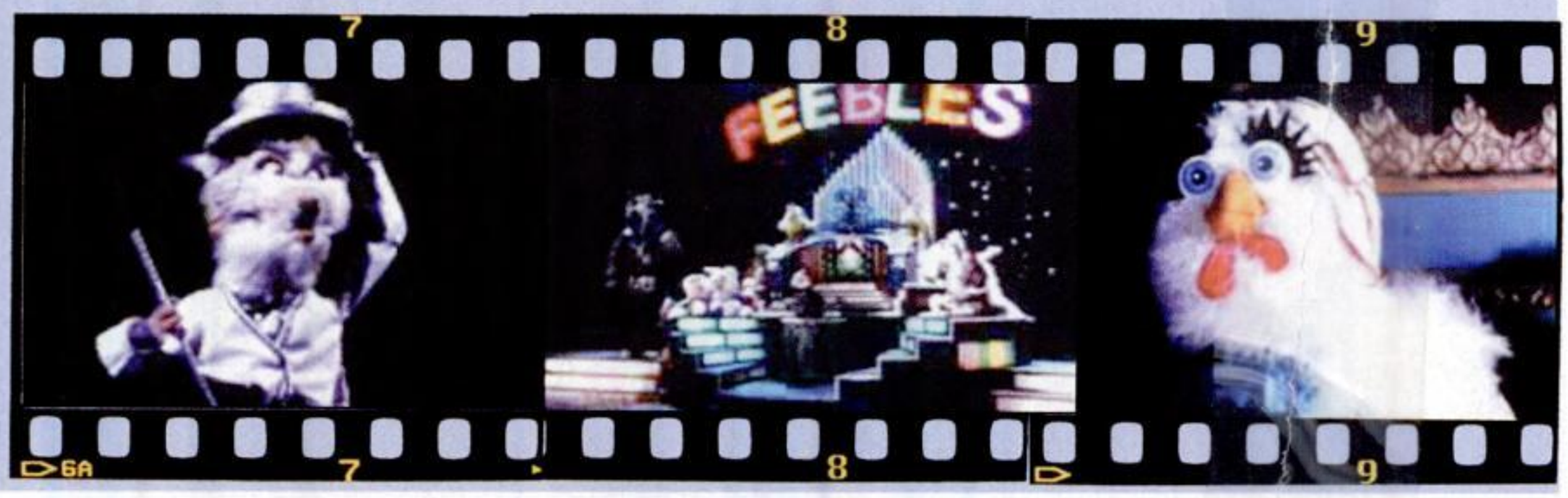

***TR* for the Pocket PC is so complete, we almost expected a "nude patch."**

## POCKET PC FILMS

**A movie theater in your pocket! (Well, a seedy movie theater)**

Carrying around a feature film and watching it on the go—now there's some gee-whiz technology for you. On its web site, Pocket PC Films (**www.pocketpcfilms.com**) promises to put "full-length feature films into people's hands," and it's true, *Leprechaun* (with Jennifer Aniston) was indeed a full-length feature. And a Traci Lords erotic-comedy "double feature" probably adds up to a full-length feature film as well.

Still, there are a few gems to be found in the web site's archive of rather musty B- and C-movies, westerns, and old TV sitcoms. Take, for example, the sci-fi booby-trap extravagan-




**Pocket PC Films like *Meet the Feebles* are encoded at a low bitrate to make them portable, so the image is less than Oscar-worthy. But how much resolution does a gun-toting hippo on a rampage really deserve?**



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## DIAMOND MINE

The first hit from developer PopCap was *Bejeweled*, and for a time, it was the most popular game on the net (it's also called *Diamond Mine* on the Pocket PC). The premise was crushingly simple: A screen fills with jewels of different colors and shapes. These jewels are eliminated by getting three of the same kind in a row. The only control is the ability to swap the position of two jewels. That's *it*. Yet as the jewels fall and disappear, new ones keep falling from the top, creating a never-ending flow that can be maddeningly difficult to stop playing.

**MAXIMUM PC VERDICT: 8**

Astraware, www.astraware.com, $15, Install size: 500K

## STRATEGIC ASSAULT

*Strategic Assault* is proof that real-time strategy gaming *is* possible on handhelds when a game is designed with the handheld in mind. Ultimately, *Strategic Assault*'s flaws (flaws common to many RTS games) bring it down a notch, but the effort itself is quite strong. There's no attempt at anything fancy here. Resources are collected by capturing and defending key buildings, while units and structures are built with simple stylus taps. Units can be grouped and moved with ease, and maps are small and manageable, creating a puzzle-like strategy game. AI and pathfinding, however, are miserable, a familiar lament among RTS gamers.

**MAXIMUM PC VERDICT: 6**

Xen Games, www.strategicassault.com, $6, Install size: 1.5MB

## SHANGHAI POCKET ESSENTIALS

It's tiny, addictive, and a perfect fit for the Pocket PC, proving again that simple is supreme in PDA gaming. Though sometimes called "Mah Jongg," *Shanghai* shares nothing with the tile game of the same name except for the look of the tiles. These tiles are stacked in different patterns, with the goal being to eliminate the stack by matching exposed pairs. The PDA version from Landware comes complete with a hundred layouts, a layout editor, play variants, and additional tiles. The only flaw is a peculiar lack of visual depth, which can make it difficult to discern exposed tile edges.

**MAXIMUM PC VERDICT: 7**

Landware, www.landware.com, $20, Install size: base game: 500K; tile and board add-on: 1.5MB

## KSE ENTERTAINMENT PACK 3.5

If, as we've observed, simplicity is the key to effective pocket gaming, then the KSE Entertainment Pack offers a whole keyring. There's plenty to keep you coming back for more on long commutes and airport holdovers. The Pack gathers eight games from KSE: *Backgammon, Cruel* (a solitaire variant), *The Mill* (aka *Nine Men's Morris*), *Poker, Snake, Yachtzee* (that extra "ch" is what makes it taste so special!), *Tetragon* (lawyer-proofed *Tetris*), and *Solitary* (jumping elimination game). All of these are fine versions of familiar games, and they all fit the handheld environment like a glove. The games are also available separately.

**MAXIMUM PC VERDICT: 6**

KSE, www.ksesoftware.com, $30 for all eight, or $5 each, Install size: 3MB total

## MONOPOLY

*Monopoly* is another instantly recognizable title that benefits from a largely effective port. There are plenty of rules options, and a number of different personalities to play against, most of them of fairly modest ability. But what makes Handmark's port really stand out is the extremely effective use of the screen space, with the entire board viewable at once as well as any properties you've bagged. Give Handmark a hand for even permitting trades between players. What was totally unexpected, however, was the multiplayer connectivity for up to four devices using IR beaming or Bluetooth!

**MAXIMUM PC VERDICT: 8**

Handmark, www.handmark.com, $30, Install size: 1.5MB

## SCRABBLE

Like the Popcap games, the very simplicity and familiarity of Handmark's board-game ports make them almost ideal handheld games. *Scrabble* is a straight-up adaptation of the tile-laying word game. The only flaw is the virtually nonexistent AI, which clearly is just drawing from a word list and largely incapable of strategic word positioning, a crucial element of the game. Be that as it may, the game's rules are known by all, and it's proven itself entertaining for decades, while something like *Spawn* will be forgotten in a couple months. Like *Monopoly*, up to four players can hook up wirelessly for multiplayer action.

**MAXIMUM PC VERDICT: 7**

Handmark, www.handmark.com, $30, Install size: 1.5MB (another 2MB for Scrabble dictionary)

za *Cube*, and *Meet the Feebles*, probably the most shocking, appalling, and tasteless movie ever made with puppets (but, hey, it's from *Lord of the Rings* director Peter Jackson). *Meet the Feebles* comes in two versions: a single 132MB Windows Media Video file for Pocket PC owners with spacious expansion cards, and the same file split into five segments of about 28MB each (this amounts to 20 minutes of viewing time for each segment). The transfer, unfortunately, is pan-and-scan. In fact, none of the movies are available in widescreen (which would have been nice in landscape mode, if that was an option). Even worse, the audio was encoded in mono, although Pocket PC Films told us that other titles are available in stereo.

Most of the titles can be had for 15 bucks each, and Pocket PC Films is beginning to offer slightly more updated fare. So is a movie from Pocket PC Films something you want to take along for the ride? Here's a quick rule of thumb: Airlines will offer better movies; buses won't. ■

Intellectual property material

# Ask the Doctor

**Symptom → Diagnosis → Cure**

Have a burning PC problem? How about a burning PC sensation? We're more than happy to help you with your PC problems, but you might want to get that sensation thing checked out by a qualified sensation checker-outer. If you have PC questions, send them to **doctor@maximumpc.com**. Just remember: We can't answer every e-mail. Oh, *no*—not by a long shot.

## Boot Time Blowup

When I start up my system, a message says: "A problem has been detected and Windows has been shut down to prevent damage to your computer. UNMOUNTABLE_BOOT_VOLUME." I've turned off the BIOS, caching, and shadowing. What else should I do?

**—OMER HADAD**

**The UNMOUNTABLE_BOOT_VOLUME error means that the program that loads XP can't load the partition that XP is installed on. This could be the result of a bad hard drive, a hard drive error, a malfunctioning drive controller, or a misconfigured system.**

**First, crank down any overclocking you've done, particularly anything that could affect your PCI bus speed. Once your CPU is at its default speed, try booting into Windows again. IDE controllers are notorious for corrupting drives when the PCI bus is overclocked. If that doesn't fix your problem, open up the case, check your IDE cables for nicks or crimps, make sure the cables are firmly seated, and make sure your hard drive is set to be the master drive on the primary channel.**

***Unfortunately, you're hosed... There's no official way to strip the encryption from the file once you've wiped the OS.***

**If none of that fixes your drive, you may be able to pull the drive, toss it in another XP system, and then run `chkdsk /f` on the drive. That may fix your drive's partition long enough for you to grab your files from it, before you reformat the drive and reinstall the OS. Make sure you run a full surface scan of the drive to check it for bad sectors before you trust it with your precious data again.**

## Encrypted Files Lost Forever

I screwed myself: I had to reinstall Windows XP on my computer, but now I have an old user folder that I can't get into. It's the Documents and Settings user folder that's denying me access. I tried changing my login name to what it was before I reinstalled the OS, but that doesn't seem to help. Is there any way to get back into this user folder, because I can't even delete the damn thing? It's just taking up 6GB or so of space. Besides, I really need the info that's inside it, so a solution would be best.

**—KRAIG ANDERS**

**Unfortunately, you're hosed. The encryption can be turned off only by way of the original install under which the files were encrypted, unless you create a backup certificate before you wipe the OS. There's no official way to strip the encryption from the file once you've wiped the OS.**

**In order to remove the directory from your hard drive, you're going to have to reformat the disk and reinstall the OS. Windows XP just won't let you access or modify anything in that encrypted folder.**

**If you want to encrypt your folders, make sure you save a copy of the recovery certificate first. That process is too lengthy to describe here, but you can find it by searching Windows Help for "Back up default recovery keys to a floppy disk." Note that encryption is an option only for Windows XP Professional users; XP Home doesn't include encryption.**

## Icons Gone Wild

About a week ago the icons on my desktop became distorted or something; sometimes the icons even disappear leaving only the text. Do you know what's going on here? It's not just the desktop, either—even the Start menu and some other things are doing this. It persists if I restart the computer.

**—BRIAN LINDQUIST**

**It sounds like you have a problem with your videocard. The first thing to do is download new videocard drivers from the manufacturer's web site. To find out the maker of your 3D accelerator, press the Windows key + Pause/Break, then go to Hardware, and click the Device Manager button. Check under the Display adapters tab to see the name of your card. Google will usually take you right to the manufacturer's site if you enter the card name as it appears.**

**If updating your drivers doesn't fix the problem, you may have a dying videocard. Try running a different card in the machine. If that takes care of the trouble, it's time for a 3D upgrade.**

**But if the alternative card exhibits the same problems as the first, a corrupt OS may be the culprit. If that's the case, you may be able to use System Restore (Start > Help > Undo changes to your system with System Restore) to roll back the OS to a time before the trouble started.**

## Water-Cooling Conundrum

Is water cooling an effective and reliable way to cool a gaming machine? If so, what brand and config would you recommend? I've been looking at Koolance and want to know what you guys think.

Second, and more important, I have been having a problem with my computer for the past year. For some reason, when I run a graphics-intense program, such as *EverQuest* or *WinAmp* at high resolutions, my computer will shut off. Sometimes it will be after 10 minutes, other times an hour or more. Once it

**When your icons go bad, a bad display card or corrupt driver is usually the culprit.**



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shuts down, it refuses to start up again. It will get power and fire up the CD-ROM drive, but that's it. I usually have to shut it off and turn it on about 30 times for it to finally boot. I've tried upgrading my power supply to an Antec TruePower 430W, and have also upgraded my 3D accelerator from a GeForce2 to a GeForce4 MX.

**—KEVIN BROOKS**

**We like the Koolance system. It was designed for the PC from the get-go, and should have all the parts you need to cool your CPU, chipset, and videocard. Water-cooling systems are great for keeping even hot-running gaming rigs at a safe temp, and they do so very quietly.**

**Your stability problem seems to be heat-related. Since you upgraded your power supply, we're pretty certain you're getting enough power for all your components. We recommend getting a new heatsink for your CPU; we like the Athlon coolers from ThermalTake or Alpha. Both are available from many of the vendors on Pricewatch (www.pricewatch.com).**

**The Koolance water-cooling kit looks professionally installed and provides quiet cooling for your system. Plus, it puts a nifty LED readout on top of your PC.**

## Clean Start Confusion

One little mistake and I'm in deep! I did what was advised in "Give WinXP a Clean Start" (August 2002). All was good and fine. Then I made the mistake of trying to reformat my second hard drive (E:) by inserting the WinXP disk, not realizing it would install and create a dual-boot system (that I didn't want), with WinXP on C: and WinXP on E:

How can I remove the dual-boot option and just have a single boot with two drives?

**—LES TOIL**

**Luckily, Les, the solution to your problem is as easy as pie. Simply open System Properties (press the Windows key + Pause/Break), go to the Advanced tab, then click the Startup and Recovery button. Press edit, and delete the second line under the [operating systems] section.**

**This will remove the offending entry from your boot.ini file, which is where the NT Loader gets the boot options you're presented with when you start your PC.**

## Silent Mode on My All-in-Wonder

I recently installed an ATI All-In-Wonder 9700 Pro. Did you guys have any trouble with the TV-recording software recording sound? I can get the device to record video, but there's no sound. I have the audio coming into the line-in in the back of the SB51G. During real-time play I can hear the audio, but playback is silent.

**—MARTY JANAK**

**Your problem is a cinch to fix. All you need to do is go into the TV app that ships with the All-in-Wonder and open the setup wizard (it's at the bottom of the Settings window). Run the setup wizard and make sure you select the proper audio input option when you're prompted. When it's set properly, you will be able to adjust the sound coming out of your speakers by using the volume slider in the TV app.**

## Driver Envy

I've seen you stress the importance of chipset drivers many times in Ask the Doctor. So I decided to update the drivers on my old Dell Dimension 4100. Using an Intel chipset identification utility, I discovered that I had an 815 Intel chipset and found at least five driver updates for it on the Intel web site.

However, Intel tells me that my system is an OEM version of an Intel Desktop Board BIOS and advises me not use its drivers, but to instead call my PC manufacturer for advice. That's right, you guessed it! Dell does not offer chipset update drivers. Is it safe to precede with the Intel drivers?

**—KEN LITTON**

**The Doctor thinks you're confusing two different things: chipset drivers and your motherboard's BIOS. We don't recommend you try to install a BIOS for any board other than the one that's specified. (The BIOS is the software that resides in a chip on your motherboard and tells your OS how to access all the nifty features of your PC.) That's a sure-fire way to kill your PC. It sounds to us like you're interested in updating your Dell mobo with an Intel BIOS, which would be bad.**

**On the other hand, chipset drivers work on any boards that use the chipset in question. Most of the chipset vendors make one driver that will work with all their modern chipsets for convenience.**

## Benchmarks Are Bizzaro

No matter which game I want to play, I can turn all the graphic options up to full and turn on 4x anti-aliasing, and they all run perfectly smooth and look great. But, when I run *3DMark2001*, I don't get really high scores, though all the tests run fine. I'm not complaining, but this has been nagging at me for a while. How is this possible?

**—BRIAN LAPIERRE**

***We don't recommend you try to install a BIOS for any board other than the one that's specified.***

**You didn't mention what games you're playing, but if you're still playing really old games like *Half-Life*, *Counter-Strike*, *Quake III*, or the original *Unreal Tournament*, even a slower system is fast enough to enable all those features without suffering an appreciable frame rate hit. However, benchmarks like *3DMark2001: SE* are designed to test performance for both current games and games that will use more advanced technology further down the line.**

## Are USB 2.0 Cables a Rip-Off?

Does the USB cable make any difference regarding 1.1 and 2.0? Is there a special cable needed to get the added speed of 2.0, or will any USB cable do the job?

**—AARON SPENCER**

**Although manufacturers recommend that you use USB 2.0 certified cables, we've not noticed any problems at all using older USB 1.0 cables with 2.0 devices. If you don't already own USB 2.0 cables, use the ones you have.**

## Ouch, I Burned My Athlon!

Is the heatsink/fan that came with my Athlon XP good enough to withstand the heat that the processor generates when I'm running intense applications, such as games, or do I need to buy a better heatsink/fan than the one that shipped with the CPU?

**—WILD WILLY**

**The heatsink/fans that ship with Athlon CPUs are certified by AMD. The only reason you would need to upgrade your heatsink is if you want to overclock your CPU, or if your PC has a case window and you want to add some bling bling. ■**

# How To...

**A step-by-step guide to tweaking your PC Experience**

# MAKE YOUR OWN CELEBRITY SOUNDBOARD

**BY BRIAN LAM**

MAXIMUM PC
TIME TO COMPLETION
01:30
HOURS MINUTES

## Let's use Macromedia Flash to build a visual interface for triggering sound files

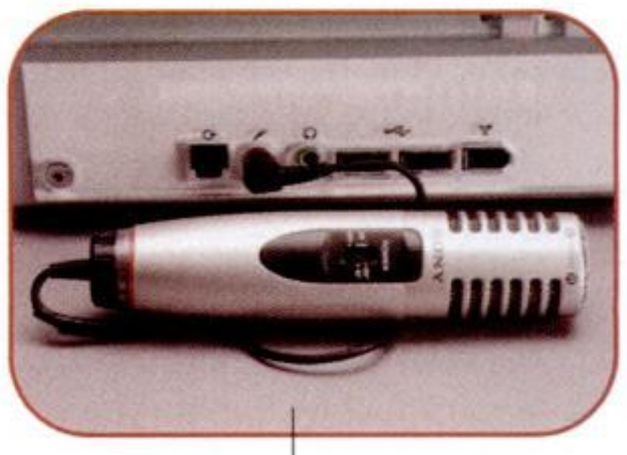
Imagine a program interface covered with buttons. Click on one, and a short sound clip instantly plays. This is the weapon of choice for modern-day prank callers. Armed with anywhere from 20 to 50 snippets of carefully chosen dialogue, a soundboard prankster can carry on an entire phone conversation with his unwitting prey, simply by hitting just the right clip at just the right moment. The hijinks are multiplied when the sound clips are pulled from, say, a Clint Eastwood or Al Pacino movie!

Now, we aren't advocating that *Maximum PC* readers make nuisances of themselves. But we do know that making a soundboard is a good way to get your feet wet with Macromedia *Flash*.

Our very own erstwhile tips columnist, Dick Matthews, found a productive use for his home-brewed soundboard. With a few clicks here and there, Dick's soundboard does all the talking on his tech-support hotline, making long hours at the help desk bearable. Little Dickie hasn't had a single sore throat since he got his soundboard up and running. Yes, it's true: Dick Matthews' soothing tech-support voice is nothing more than a *Flash* soundboard loaded with prerecorded PC solutions. Here's how he created it...

## What You'll Need

- Macromedia *Flash* MX ($500 for the full version, or get a demo for free, www.macromedia.com)
- Any microphone ($10, www.radioshack.com), or you can just use sound clips that have been prerecorded
- Dynametric TMP-636 PC/telephone audio adapter ($80, www.dynametric.com)



## Step 1: Microphone Check

**If you'll be using your own voice to record new sounds, do the following:**

- Jack in your microphone.
- Adjust your mic input recording volume in Windows' Sounds Control Panel, then press the top Advanced button. Next go to the Options menus and click Properties. Select "Adjust volume for: Recording," and make sure the "Microphone Volume" is checked.

- Open up the Sound Recorder that comes with Windows. Go to Start> All Programs> Accessories> Entertainment.
- Hit record, and record a clip.
- Go to the File menu and hit Save As. In the Save As dialog, click "Change" and set the audio format to 44,100/16-bit/mono. Save all your files in a directory on your desktop.

If you already have some prerecorded sound clips, save them all in a directory on your desktop. If you want to record sound files from a DVD player, go back to the Windows Sounds Control Panel to edit your recording sources again. Look for a device called "What you Hear" or "Stereo Mix." You're looking to record the sounds your PC plays through its internal mixer.



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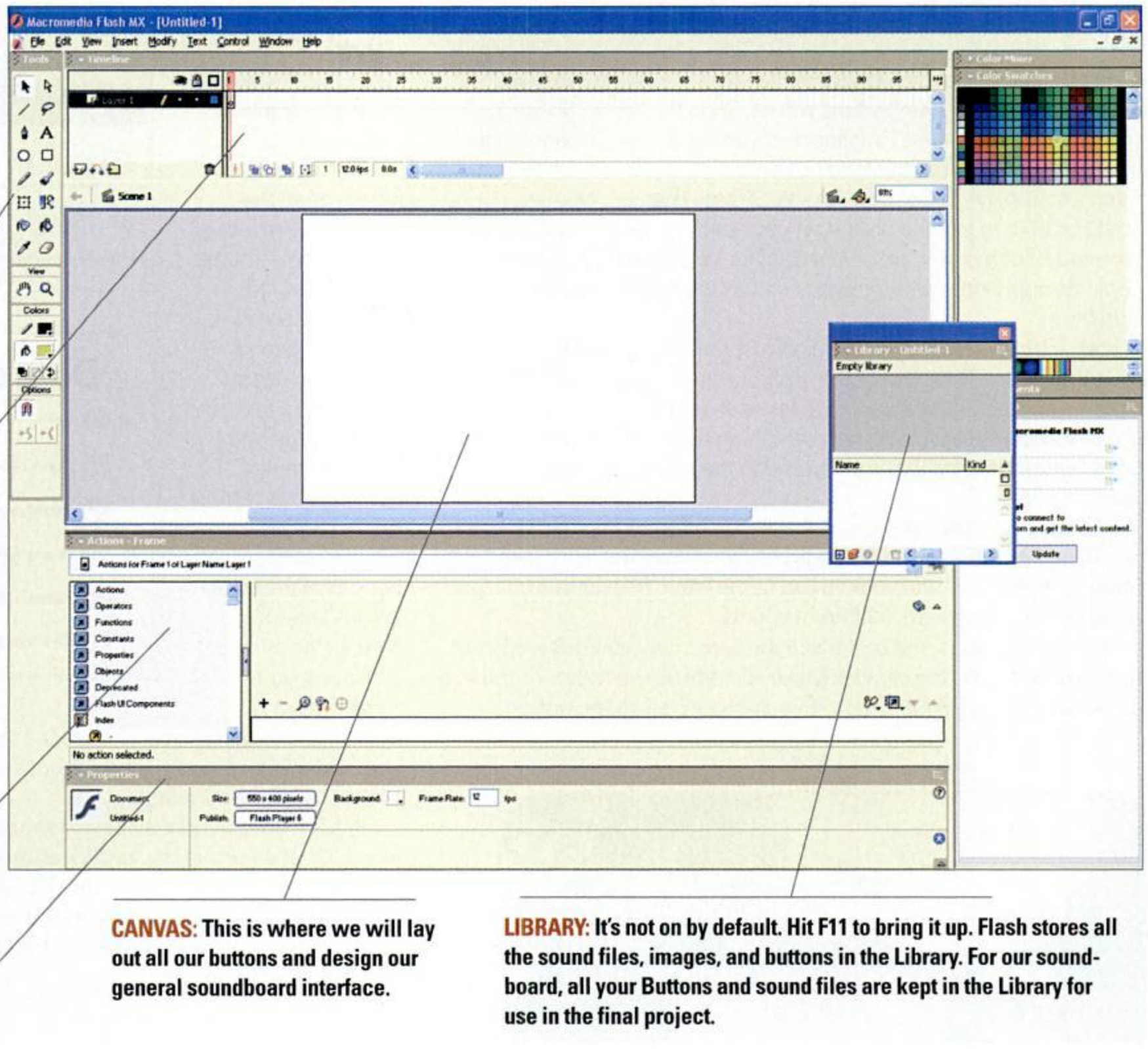
# Step 2: Getting to Know Flash

Open *Flash* and get acquainted with the interface. Don't worry, you only need basic knowledge of *Flash's* toolset to finish our project.




**TOOLBAR: Make sure you find the drawing tools (the oval and square), and the color selection drop down.**

**TIMELINE: Unlike regular animations, scripted *Flash* animations don't run through frame after frame. In fact, a complex app can be scripted entirely within one frame (which is what we'll do in this How-To). Regardless, every *Flash* user needs to know where the timeline is.**

**ACTIONS/PROPERTIES: Actionscripting is *Flash's* proprietary scripting language. Click on the action window's arrow to close it. We won't use actionscripting today—but pay attention to where the Properties window is.**

**CANVAS: This is where we will lay out all our buttons and design our general soundboard interface.**

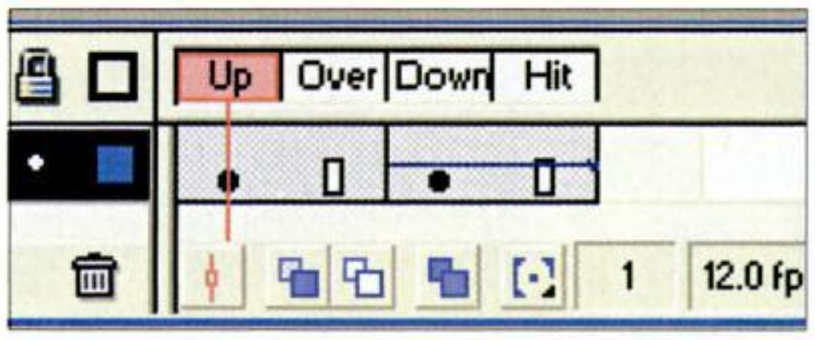
**LIBRARY: It's not on by default. Hit F11 to bring it up. Flash stores all the sound files, images, and buttons in the Library. For our soundboard, all your Buttons and sound files are kept in the Library for use in the final project.**

# Step 3: Build Your Button

Each button on the soundboard will be labeled with the actual dialogue it triggers. But before you begin labeling, you should import your sounds.

First, go to File> Import to Library, and browse to the folder where you saved all your audio files. Select them all and import them at once. All your sounds should now be in the Library (see image 1).

Next, we'll create our first button. It's going to be the blueprint from which all our other clip-triggering buttons will be created. Go to Insert> New Symbol on the menu (or hit Ctrl + F8) to create a new Symbol (in *Flash* parlance, a symbol is nothing but a Library item). Name your new symbol "button1" and select the choice "button" for its behavior.




Timeline represent the button's different states (Up, Over, Down), as well as the Hit frame, which defines the area of the button that's sensitive to the mouse.

Your button should show up in the Library (you can hit F11 to bring the Library back up). Right-click your new button, and select Edit. Using either the oval or rectangle drawing tool, click and drag on the canvas to create a shape. Center it on the crosshairs in the middle of the canvas, and press Ctrl+A to select the object. Looking at the Properties window on the bottom of the screen, change the Width and Height to 30 pixels.

Now, click the fourth frame in the Timeline window, called "Hit," and then press F5. This will copy the square you drew in frame one to the other frames required for the button. Note that the four frames in the

Click on the third frame entitled "Down," and hit F6 to create a key frame. The frame should have a dot in it. This indicates that the frame is now a key frame, meaning that unique properties—like a sound clip—can be attached.

Finally, you need to attach a sound to the button. Click on the Down frame in the Timeline. Look toward the bottom of your screen's layout for the Properties box, which should have a drop-down box for sound. Select your first sound here. Now, when the button is clicked, it will move into the "down" state, and the sound will play. Your button's timeline should look like this (see image 2).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## Step 4: Building the Soundboard

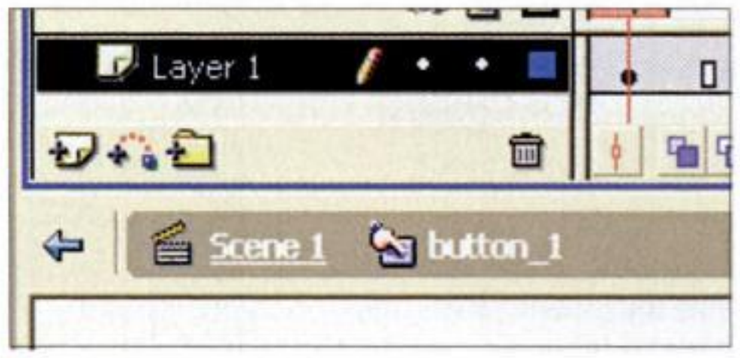
Now you need to test the button. Switch back to editing the main canvas on which all your buttons will lie. To do this, click "Scene 1" in the grey area between Timeline and Canvas (see top image). With the Library open, drag your new button onto the desktop. To test your button's sound, go to Control> Enable Simple Buttons. Now you should be able to test the button on your Canvas. Note that if you want to move any of the buttons on the Canvas, you'll have to uncheck Enable Simple Buttons before you can use the black arrow tool to reposition them.

You've got to create additional corresponding buttons for the remaining sound files. Right-click your button in the Library (F11) and select duplicate. Create a duplicate for each sound in your Library, and be sure to rename each of them something different. We recommend giving buttons names that correspond to the sound files they will be matched with.

Right-click a copied button, click the Down frame (the third frame) and, in the Properties window, swap the sound we used in the original button for the sound you want to use in the copy. Repeat this until each button is associated with a different sound.

Position the rest of the buttons in the same way you dragged your original button onto the canvas. Make sure you leave room for the text labels we're going to make next. If you need to rearrange buttons, remember to use the black arrow selection tool.

To create text labels, go to the toolbar and select the text tool—it's the big "A." Click the Canvas (make sure you're in "Scene 1", not on any button), and create a text box you can type into. Note that while using the text tool, the Properties window at the bottom of the screen lets you select font type, color, and size.

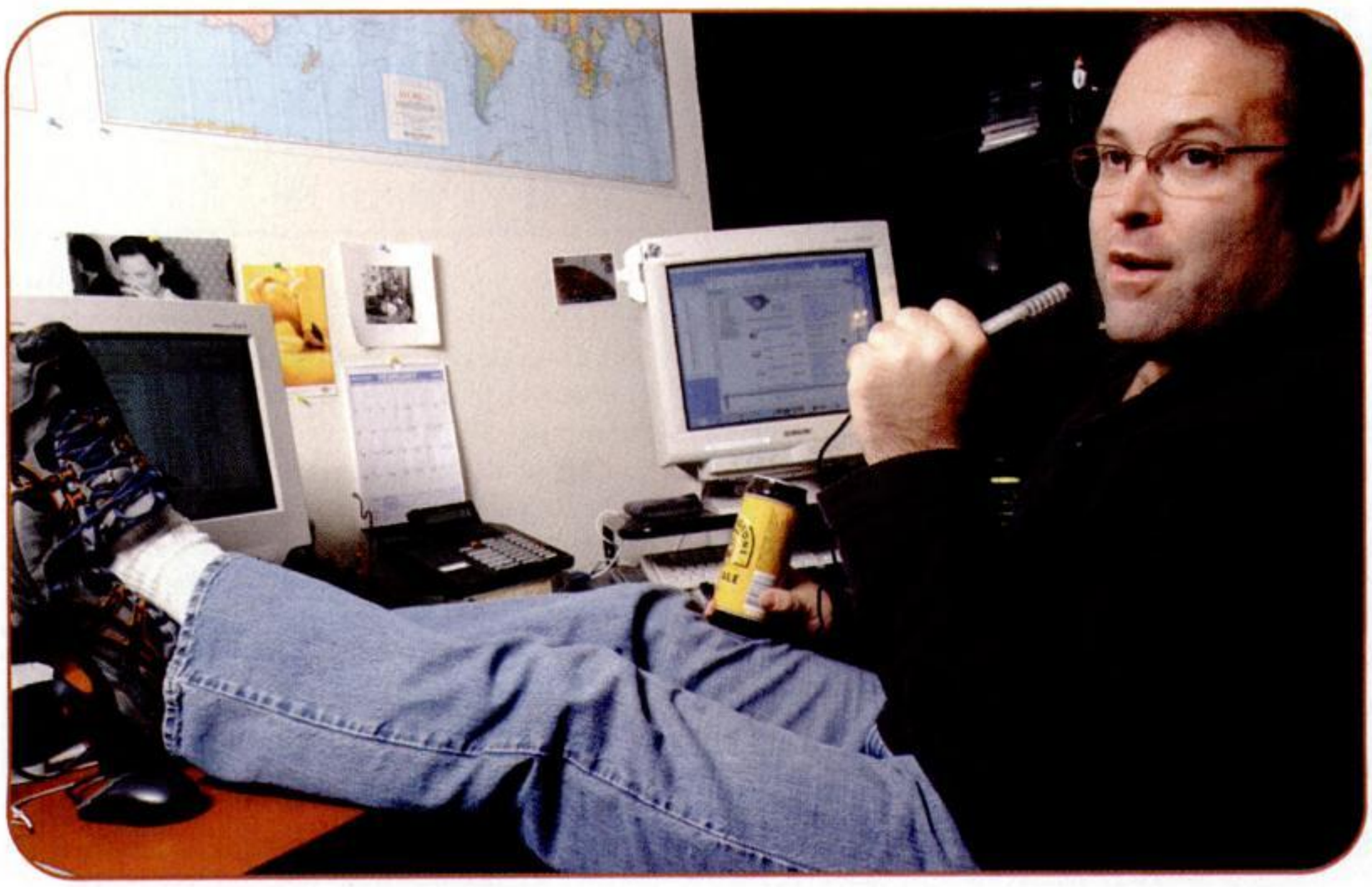


Finally your *Flash* project is done, if a tad spartan. You can choose to import images, and spice up your soundboard, but that's your business. Make sure you save the project before continuing.

Publish your project by navigating to File> Publish Settings on the menu. On the Format tab, unclick all the checkboxes except Windows Projector. Hit publish, and the file will have been exported into the directory where your *Flash* file is. This exported project will run by itself under Windows as an executable, and won't require *Flash* or even a *Flash* plug-in to run.

## Step 5: Operators Are Standing By

When you run the exe file, all your sound files are no more than a click away. If you're a budget-conscious, lazybones tech-support helper, you can simply hold your handset up to your speakers during phone calls, but that's a little low-tech for Dick. He invested in the Dynametric TMP-636 PC/telephone audio adapter. It lets you directly connect your PC's output to your phone line. If you've got this device, plug the black mini-jack plug into your PC's headphone jack, and plug the unit into your telephone handset. Using the grey mini-jack cable, your phone call can be output to your PC, too. Just remember that recording phone calls may be illegal where you live. You've been warned. Still, you probably won't get in trouble for calling up one of your good friends for a little fun. ■



**Having prerecorded his tech-support wisdom, Dicky's soundboard says "Control-Alt-Delete, Numbnuts!" for him.**



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# First came the *Personal Computer.*

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# In the Lab

**A behind-the-scenes look at Maximum PC testing**

## The Truth about Hard Drive Headroom

The label might say '133MB/s,' but you'll never see these speeds in real life

**This DiamondMax 9 is fast because it's packed with modern moving parts, not because it runs on an ATA/133 interface.**

Every time the PC industry increases the throughput ceiling for IDE devices, the marketing drones increase their hype accordingly: "100MB per second! 133MB per second! A mind-blowing 150MB per second!"

But these speed bumps rarely (if ever) help your real-world performance because advancements in interface speeds have always preceded advancements in actual hard drive speeds. Think about it: While today's fastest parallel IDE controllers might be able to handle 133MB/s of throughput, no single hard drive will even push maximum read speeds in excess of about 66MB/s.

In fact, higher and higher throughput ceilings continue to roll out only in *anticipation* of faster hard drives. Why? Because it's a hell of a lot easier to develop faster IDE controllers than it is to develop faster hard drive internals (platters, drive heads, etc.), and the storage industry simply wants to be ready with a standardized motherboard infrastructure when the internals catch up. You don't wait for traffic jams before building a new highway.

All of which brings us to this month's Lab lesson. In our February issue Head2Head department, we tested three new IDE hard drives—an IBM, a Western Digital, and a Maxtor. The IBM and WD drives are spec'd for ATA/100 speeds, while the Maxtor is spec'd for ATA/133. Maxtor is actually the only drive company offering a 133MB/s throughput ceiling; its competitors have eschewed ATA/133 in anticipation of the switch to 150MB/s Serial ATA.

**DARE TO COMPARE — ATA INTERFACES**

| MAXTOR ULTRA SERIES ATA133 200GB | Promise Ultra100 TX2 (ATA/100) | Promise Ultra133 TX2 (ATA/133) |
|---|---|---|
| SYSmark2002 office productivity | 163 | 163 |
| HDTach average sequential read | 44.8MB/s | 44.8MB/s |
| HDTach average sequential write | 27.5MB/s | 27.5MB/s |
| HDTach random access time | 12.9ms | 13.5ms |
| IOMeter desktop total I/Os per second | 112 | 113 |
| IOMeter desktop average I/O response time | 569ms | 565ms |

**DARE TO COMPARE — PARALLEL AND SERIAL ATA**

| SEAGATE BARACUDA V 120GB | Parallel | Serial ATA |
|---|---|---|
| SYSmark2002 office productivity | 161 | 161 |
| HDTach average sequential read | 36.6 MB/s | 36.5 MB/s |
| HDTach average sequential write | 28.5 MB/s | 28.3 MB/s |
| HDTach random access time | 13ms | 13.4ms |
| IOMeter desktop total I/Os per second | 129 | 116 |
| IOMeter desktop average I/O response time | 496ms | 549ms |

For the sake of consistency, we ran all three hard drives on a Promise Ultra100 TX2 controller card, properly assuming that this ATA/100 card wouldn't bottleneck the ATA/133 Maxtor Ultra Series drive. Nonetheless, some readers protested, arguing that we didn't let the Maxtor drive compete at its fastest potential speed.

Well, this month, we retested the Maxtor drive to prove that even when paired with an ATA/133 controller, it still trails the IBM drive, which won our February showdown. For our testing, we used our standard 2GHz P4 test bed, and the same ATA/133 Maxtor Ultra Series drive that we used two months ago. First we ran our tests with the Maxtor connected to a Promise ATA/100 card, and then we repeated the exact same tests with a Promise ATA/133 card.

As you can see from our benchmark chart, in *HDTach* and *IOMeter*, scores for reads, writes, access times, and even I/Os per second were more or less identical. The extra bandwidth headroom provided by the ATA/133 controller simply goes to waste. Our chart only notes average reads and writes, but consider the *maximum* read speed achieved by the Maxtor drive: 64MB/s. That's right, just 64MB/s when teamed up with either the ATA/100 or ATA/133 controller. That's far below the 100MB/s and 133MB/s speeds that the interfaces can handle. Hell, it's even below the 1998 ATA-5 standard of 66MB/s.

Bottom line: If you take a horse from a dirt road and put it on a freeway, it still won't trot at 100mph.

We also decided to test ATA/100 versus Serial ATA, which boasts a ceiling of 150MB/s. For these tests, we used the same 2GHz P4 test bed, and two nearly identical Seagate Barracuda V drives, one with a parallel interface, one with a SATA interface. The parallel drive was hooked up to our ATA/100 Promise controller, while the SATA drive was running off a Silicon Image SATA PCI controller provided by Seagate. The benchmark results were similar to those of the ATA/100 versus ATA/133 tests—no appreciable differences were discovered. This didn't surprise us, but should silence the ignorant.

Although a drive's interface doesn't tell you how fast the drive is, it does generally tell you how old it is. For this reason, any 7200rpm ATA/100 drive will generally outclass a 7200rpm ATA/66 drive—and not because of the interface, but because the ATA/100 drive packs modern technology.



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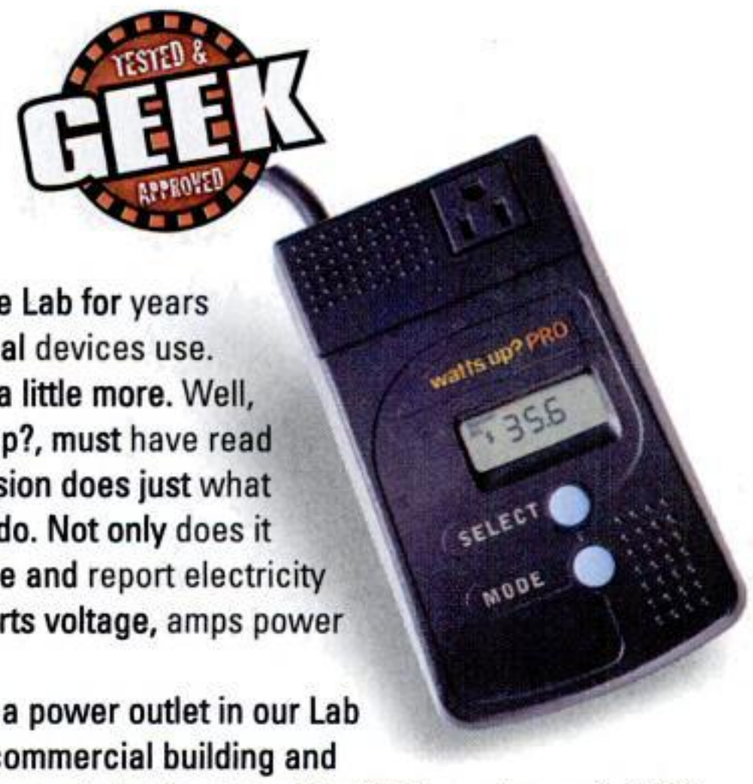
# watts up? PRO




**We had the original "watts up?" in the Lab for** years **to measure how much power electrical** devices use. **But we've always wished it could do a little more.** Well, **EED, the maker of the original watts up?, must** have read **our minds, because the new PRO version does just** what **we always wished the original could do. Not only** does it **log the wattage consumed by a device and** report electricity **chomped in dollar values, it also reports voltage,** amps power **factor, and duty cycles.**

We hooked up the PRO version to a power outlet in our Lab to monitor the voltage swings in our commercial building and were surprised by the power sags we saw in just an hour. The PRO can log up to 1,000 data points into nonvolatile RAM, and the information can be downloaded to a PC via a serial cable. Expect to see many Lab antics using the watts up? PRO.
**www.doubleed.com**, $131

# What Was That Number Again?

## Useful utilities for absent-minded geeks

If you ever find yourself hunting about for your rig's product key, there are two handy utilities you can turn to. The first is *Magical Jelly Bean Keyfinder*. A freeware program, this app will reveal the product key that you used for your rig's Microsoft OS installation, as well as the product key for most versions of Microsoft *Office*. Another useful app is *AIDA32*. A general diagnostic similar to *SiSoft Sandra*, it provides a wealth of information about your PC, and also reveals the product key of your OS and the keys of other applications installed. Both programs are free. To download *Magical Jelly Bean*, visit **www.magicaljellybean.com**. For *AIDA32*, visit **www.aida32.hu**.

# Best of the Best

As of April, 2003

Here are our current top picks for each hardware category. Red text indicates first month on chart. Check back next month for updates.

**High-end videocard:**
Hercules 3D Prophet 9700 Pro

**Budget videocard:**
ATI Radeon 9500 Pro

**Do-everything videocard:**
All-in-Wonder 9700 Pro

**Soundcard:**
Sound Blaster Audigy 2 Platinum

**Hard drive:**
IBM Deskstar 180GXP 8MB version

**CD-RW drive:**
Plextor PXW4824TA/BPS

**DVD burner:**
Sony DRU-500A

**LCD monitor:**
Sharp LL-1820

**CRT monitor:**
Sony F520

**P4 motherboard:**
Asus P4T533-C

**Athlon XP motherboard:**
Asus A7N8X Deluxe

**Portable MP3 player:**
iPod 20GB

**Photo printer:**
Epson Stylus Photo 1280

**Pocket PC PDA:**
Toshiba e740

**5.1 speakers:**
Logitech Z-680

**4.1 speakers:**
Logitech Z-560

**2.1 speakers:**
Klipsch Promedia 2.1

**Our current gaming favorites:** *SimCity 4, Battlefield 1942, Battlefield 1942: The Road to Rome, Medieval Total War*

# Wherefore Wi-Fi?

Wi-Fi is officially hot! We've seen the wireless technology known as 802.11b make its way into notebooks, print servers, and even cameras. So, to keep up with the Joneses, Maximum PC R&D turned its attention to "Wi-Fi enabling" a host of new toys. We present our first wireless wonders...

**We've waited too danged long for vendors to make these, so we made them ourselves! That's right: We added Wi-Fi to a set of Klipsch 5.1 speakers so we could mount the two rear satellites without running unsightly wires. By supporting 802.11b as well as the "g" version, we have plenty of bandwidth to support audio—in our deluded, alternative universe, that is.**

**The boys and girls of summer will want to check out the first bat that's capable of transmitting all your stats to the color man in the booth: At bats, hits, RBIs, everything. Specially forged by the Original Maple Bat Company, the Wi-Fi bat runs on lithium ion cells and can stream data continuously for up to 12 innings between charges. If it worked, that is.**

**Why wait until you're sitting at your desk? By embedding the world's first organic Wi-Fi chip into a human being, we're able to read our *Outlook* e-mail up to 300 feet from the desktop. We had issues with spurious transmissions when microwaving lunch, but attenuating the signal loss and moving it from the nostrils gave us a 10dB signal increase. Well, at least with Gordon's nostrils, that is.**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# Falcon Mach V Exotix

## We pledge allegiance to ATI and the Athlon XP

**O beautiful, for Barton skies, for frame rates so insane...**

While America wages war on terror, Falcon Northwest is spearheading the war on slow frame rates. And in true American tradition, Falcon's war machine is a melting pot of international parts—a Taiwanese Asus motherboard, IBM hard drives from the US of A, and a hot-off-the-fab ATI Radeon 9800 Pro from the land of moose, maple leaves, and Mounties. The latest games don't stand a chance against this elite battalion of hardware.

MAXIMUM PC KICK ASS PRODUCT

Armed with ATI's new card (see page 16), this machine is magnificent overkill for today's games, and perfectly equipped to handle the best games released this year—including, of course, *DOOM III*, which should effectively separate the men from the boys. In fact, a *3DMark2001* Game 4 score of 83.3fps makes the Mach V Exotix the fastest OEM gaming machine we've tested, ever. Unencumbered by a hellacious heating solution like that of some *other* next-gen videocards, the 9800 Pro makes the Falcon stealthier than a Navy SEAL.

The Falcon did well in our CPU-based tests, too. Although the Polywell (reviewed on page 62) and Falcon use the same nForce mobo and AMD 3000+ Barton, the Falcon was faster in two key CPU tests by a few seconds. In Adobe *Premiere* (a test that's become a showcase for Athlon XP processing prowess), the Falcon finished our home-brewed action script in 281 seconds, seven seconds faster than the Polywell. And in *MusicMatch*, the Falcon converted a WAV file to MP3 in just 175 seconds, six seconds faster than the Poly. These times are behind those of the latest P4 systems, but are the best scores we've seen for an AMD box.

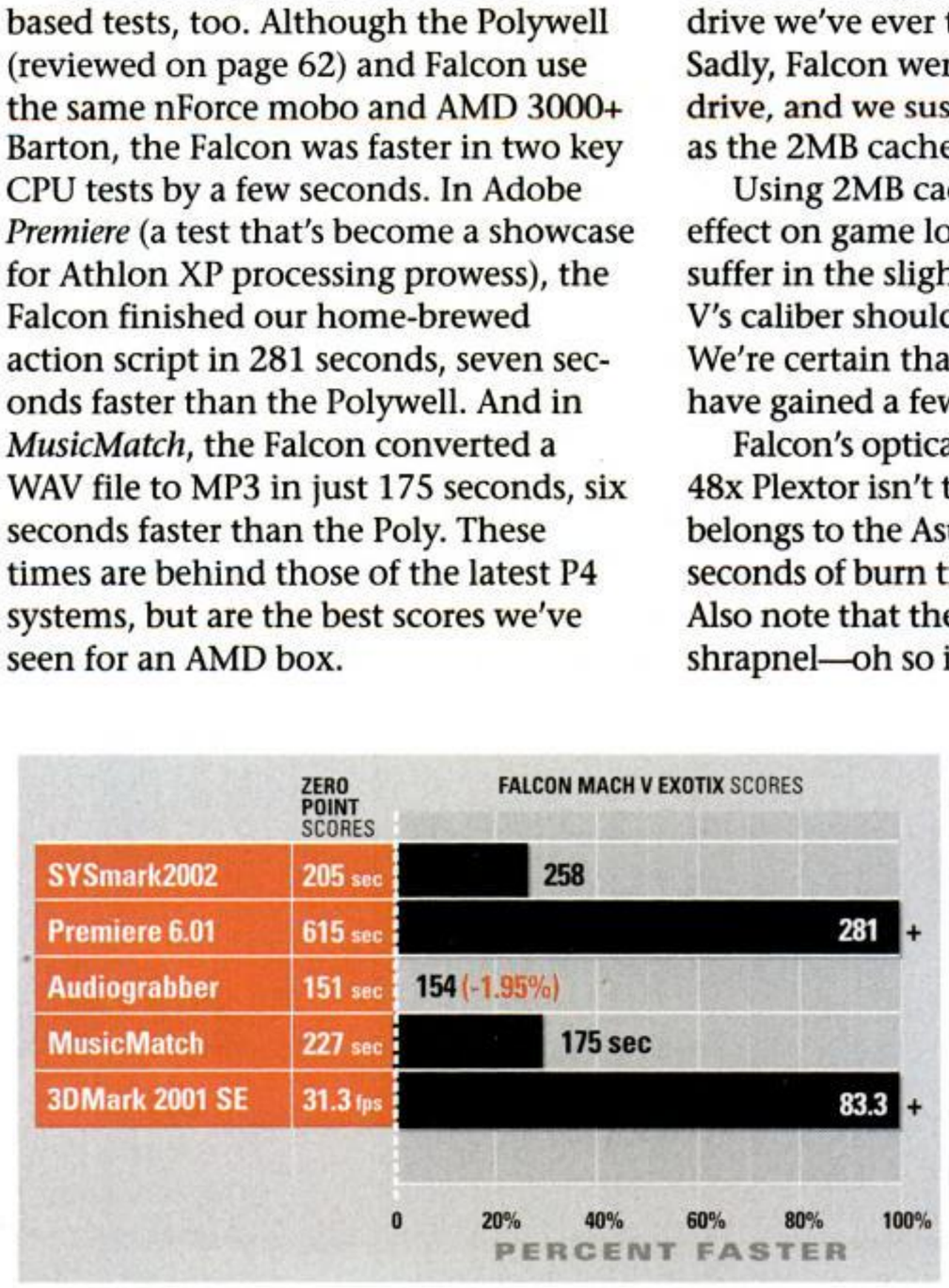
Given its high scores in these CPU-dependent tests, we were a little disappointed with Falcon's *SYSmark2002* performance. The Mach V Exotix finished with 258 points, eight points less than the Polywell. We have to blame the pair of 80GB IBM 180GXP hard drives tethered together in a RAID 0 configuration. The 180GXP is indeed the fastest drive we've ever tested—the 8MB cache version, that is. Sadly, Falcon went with dual 2MB cache versions of the drive, and we suspect these "lite" 180GXPs aren't as fast as the 2MB cache Western Digitals that Polywell chose.

Using 2MB cache IBMs will probably have a modest effect on game load times, but frame rates shouldn't suffer in the slightest. Regardless, a machine of the Mach V's caliber should have cream-of-the-crop componentry. We're certain that with larger caches, the machine could have gained a few points in *SYSmark2002*.

Falcon's optical drives didn't disappoint us. The 48x Plextor isn't the fastest CDRW available (this title belongs to the Asus 52x), but we're willing to trade a few seconds of burn time for time-tested Plextor build quality. Also note that the Plextor's bezel is reinforced to stop stray shrapnel—oh so important in these days of high spin rates. DVD duties are tag-teamed by a Toshiba 16x DVD reader, and a DRU-

### UNDER THE HOOD

| | |
|---|---|
| **THE BRAINS** | |
| **CPU** | Athlon XP 3000+ (2.16GHz) |
| **Mobo** | Asus A7N8X Deluxe |
| **RAM** | 1GB PC2700 DDR |
| **I/O ports** | Six USB, one FireWire, PS/2 mouse, PS/2 keyboard, serial ports, VGA, DVI, S-video, Creative Platinum Ex breakout box |
| **LAN** | Onboard 10/100 |
| **DISPLAY** | |
| **Videocard** | ATI Radeon 9800 Pro 128MB |
| **CRT** | not included |
| **STORAGE** | |
| **Hard drives** | Two 80GB IBM 180GXP (2MB cache) |
| **RAID** | Promise FastTrak TX2000 |
| **DVD-ROM** | Toshiba 16x / Sony DRU-500A DVD Burner |
| **CD-RW** | Plextor PXW4824TA/BPS |
| **AUDIO** | |
| **Soundcard** | Creative Audigy 2 Platinum Ex |
| **Speakers** | not included |
| **FINE DETAILS** | |
| **Case** | Cooler Master ATC-110 |
| **Fans/extras** | Two 80mm front intake fans, one 80mm rear exhaust fan, one 80mm top mounted exhaust fan |
| **Mouse** | not included |
| **Keyboard** | not included |
| **BUNDLE** | |
| Windows XP Home, Sonic MyDVD | |
| **BOOT: 49 sec.** | **DOWN: 9 sec.** |




*Our zero-point system includes: an Intel D850MV motherboard, a 2GHz P4 CPU, 512MB PC800 RDRAM, a GeForce4 Ti 4600 videocard, and a Western Digital 1000BB hard drive (2MB cache).*

### MAXIMUM PC VERDICT

***MACH V EXOTIX***
FALCON NORTHWEST

**+ AMERICAN RIGHTS**
Fastest Athlon XP processor, Radeon 9800 Pro, awesome optical drive choices, top-notch Audigy 2 solution, and an inspiring paint job.

**– AMERICAN TAXES**
Hard drives should have been 8MB cache versions. Not the right machine for Intel fan-boys.

**www.falcon-nw.com**
**$4,221** (includes $700 paint job)

**9**



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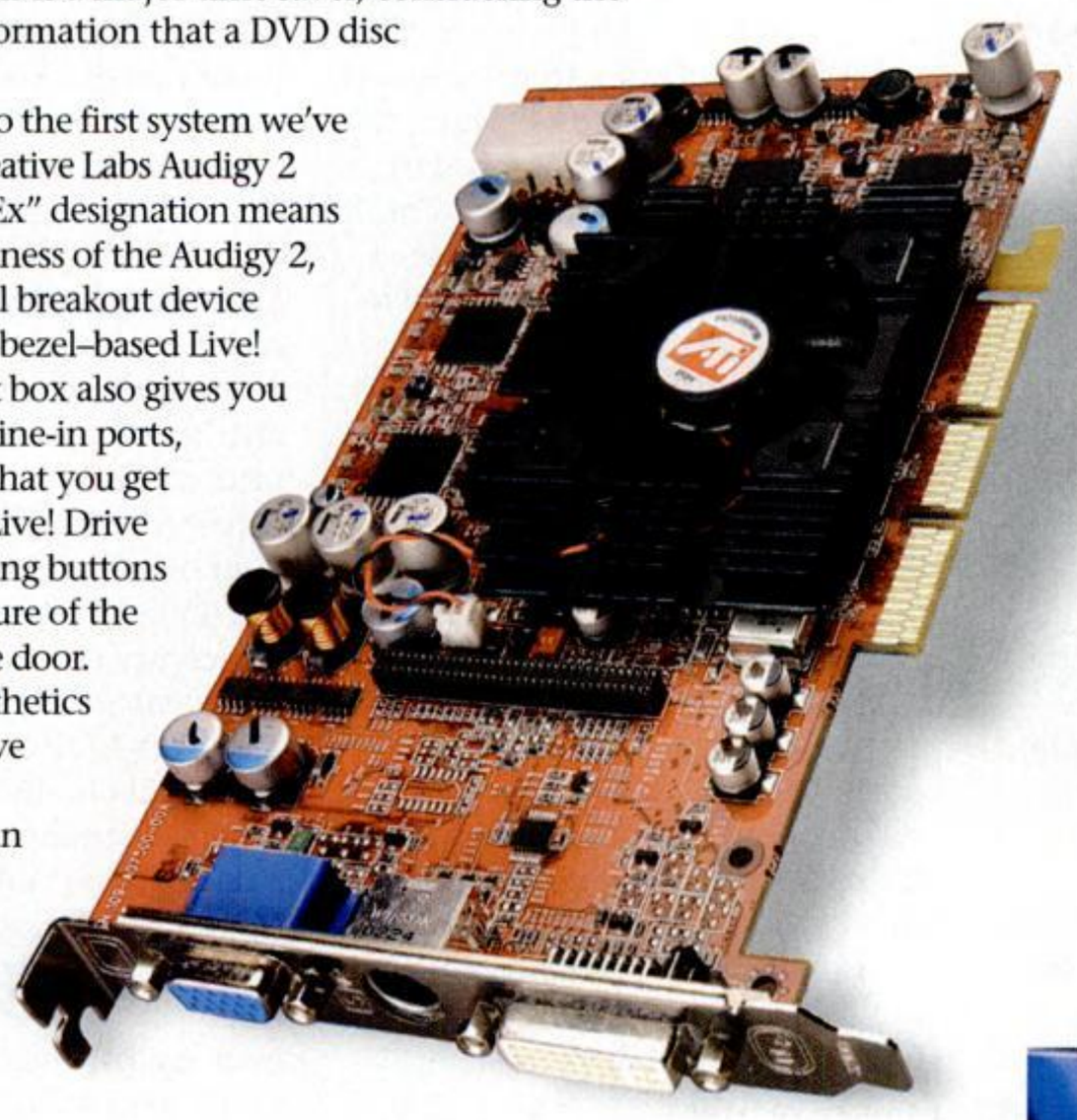
**Breakin on out:**
**The Audigy 2 Platinum Ex breakout box has a ton of ports, sits horizontally or vertically next to your PC, and doesn't stop the Cooler Master from shutting its door like the internal Live! Drive does.**

500A Sony drive that handles both DVD-R and DVD+R. Why two DVD drives? Well, if you're making dupes of your DVD data discs, or even duping movies using software like *DVDXCopy*, two drives let you copy data from drive to drive on the fly. This is a major time saver, considering the vast amount of information that a DVD disc can hold.

The Falcon is also the first system we've reviewed with a Creative Labs Audigy 2 Platinum Ex. The "Ex" designation means you get all the goodness of the Audigy 2, but with an external breakout device instead of the front bezel–based Live! Drive. The breakout box also gives you extra FireWire and line-in ports, but we mostly like that you get the benefits of the Live! Drive without its protruding buttons preventing the closure of the Cooler Master's case door.

The Falcon's aesthetics are no less impressive than the hardware inside. The American flag design is hand-detailed, with red, white, and blue trim running down the face of the case. So inspiring was the paint job, all our editors dropped their clipboards to recite the Pledge of Allegiance. If you're French, or just plain anti-American, Falcon offers other awesome-looking paint jobs as well.



**Eat dust, dustbuster:** **Without causing a tornado or taking up two PCI slots, the unassuming 9800 Pro puts even more distance between nVidia and ATI in the race for faster 3D.**

**Three eyes:** **Double DVD drives do disc-to-disc duplicates in a dash. A single CDRW drive samples and sears your CDs swiftly.**

**American graffiti:** **The hand-painted stars-and-stripes scheme on the Exotix is one example of Falcon's custom work. Your own Exotix can be painted any way you like.**

Without a doubt, the Falcon and its 9800 Pro are born to game. But thanks to the CPU's video-editing strength and the rig's dual DVD drives, we can see the Mach V Exotix as a DVD video studio as well. Drop in two 8MB cache IBM drives, and we're ready to enlist on the spot.

—BRIAN LAM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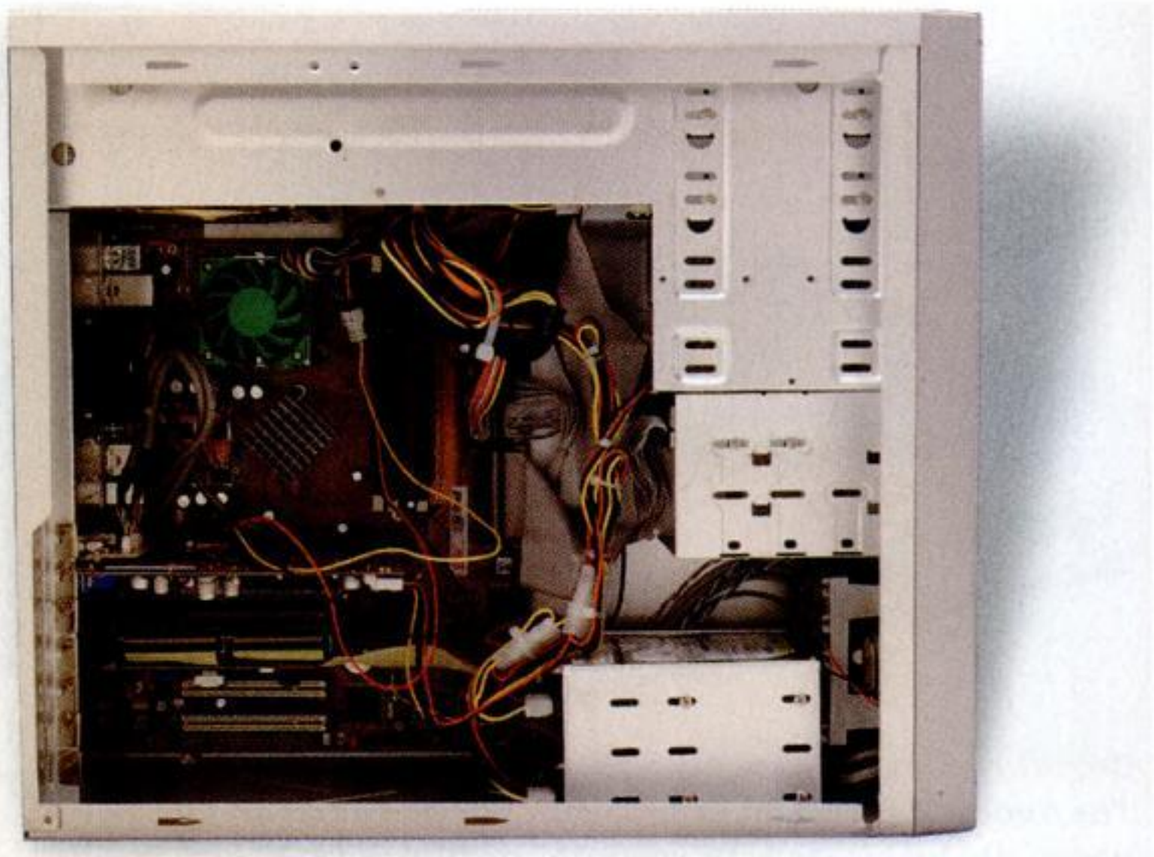
# Polywell 880NF2

## A carton of Barton leaves the benchmarks a-smartin'



**The 880NF2 boasts better parts and benchmark scores than its eponymous predecessor.**

The Polywell system we reviewed in January had the exact same "880NF2" designation as the PC you see on this page, but the two rigs are worlds apart. Different mobo, different videocard, different DVD drive, different CD burner. Gone too is the Athlon XP 2700+, and in its stead is a hot-off-the-fab Athlon XP 3000+, aka "Barton."

The "new" 880NF2 punished *SYSmark2002* for a score of 266, making it the fastest AMD rig we've ever tested in this benchmark. (The Barton rig we built ourselves last month hit just 248, albeit with less RAM and a slower hard drive subsystem.) But the real story was in *MusicMatch*—the 880NF2 stunned us by converting our WAV file to MP3 in 181 seconds. This is almost 25 percent faster than January's 2700+ system. Keep in mind that the 2700+ and 3000+ run at the exact same CPU frequency and system bus speed (see more about this in our Barton feature on page 38), and *MusicMatch* is almost entirely CPU-dependent. In short, the 25 percent boost can be ascribed to Barton's double-size, 512K L2 cache.

All in all, the 880NF2 is a great deal. You get a Radeon 9700 Pro, two 80GB Western Digitals running in RAID 0, a 52x CD burner, a 19-inch monitor, and an aluminum case (among other bells and whistles), for about $2,150. This is less expensive than the rig Polywell sent us two months ago, which had a slower CPU and a much slower nVidia videocard.

About the case: The rear allows just one 60mm fan, and there's no spot on the side panel or the top to add more cooling. And with two 7200rpm hard drives, the Radeon 9700 Pro, and the XP 3000+, the atmosphere gets a bit toasty. The cooling configuration was complicated by the fact that the system came to us with the power supply exhaust fan unplugged! In its out-of-the-box state, nForce2's southbridge—which doesn't have any cooling—was clocking in at a crispy 130° F. Meanwhile, various spots on the mobo reported 110° F and higher.

After connecting the exhaust fan ourselves, temps went down by about 15° F all around, but this still doesn't leave a lot of room for overclocking and upgrading.

The 19-inch AOC monitor is butt. Not only is it shadow-mask (as opposed to the much more vibrant aperture-grille technology), it also can hit just a mere 75Hz at 1600x1200. The wireless keyboard is also bunk, but considering the low price of the system, you could throw out these extras and just buy your own. And let's not forget that the 880NF2 comes with very strong key components, which is what *Maximum PC* cares about most. The Asus A7N8X motherboard—with dual-channel DDR, onboard Ethernet, quality 5.1 sound, FireWire, and Serial ATA—brings a lot to the table, and was the favored board in our February Athlon mobo roundup. The 9700 Pro still holds its own against the GeForce FX, but it's no Radeon 9800 Pro. So, when you think about it, all the 880NF2 needs is a DVD burner, quality speakers, a nice monitor—and the latest ATI 3D chipset.

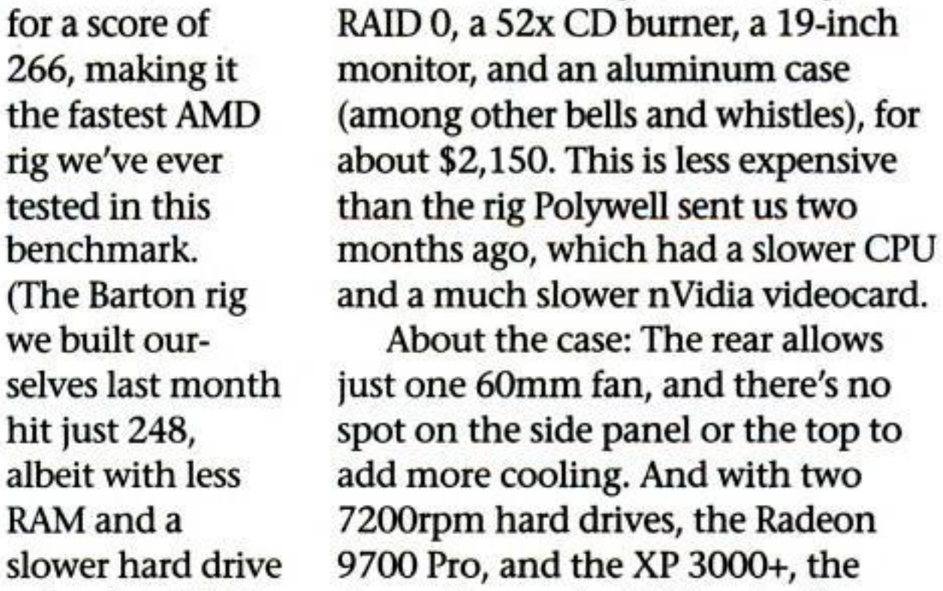
**—TOM MCNAMARA**

### UNDER THE HOOD

| | |
|---|---|
| **THE BRAINS** | |
| **CPU** | Athlon XP 3000+ (2.16GHz) |
| **Mobo** | Asus A7N8X Deluxe |
| **RAM** | 1GB PC2700 DDR |
| **I/O ports** | Six USB, one FireWire, PS/2 mouse, PS/2 keyboard, serial ports, two mic inputs, front headphone jack, VGA, DVI, S-video |
| **LAN** | Onboard 10/100 |
| **DISPLAY** | |
| **Videocard** | ATI Radeon 9700 Pro 128MB |
| **CRT** | 19-inch AOC 9GLR |
| **STORAGE** | |
| **Hard drives** | Two 80GB Western Digital WD800JB (8MB cache) |
| **RAID** | Highpoint 2-channel Ultra ATA/100 |
| **DVD-ROM** | Toshiba 16x |
| **CD-RW** | LiteOn 52/24/52 |
| **AUDIO** | |
| **Soundcard** | Onboard Soundstorm 5.1 |
| **Speakers** | Creative Inspire 5.1 5200 |
| **FINE DETAILS** | |
| **Case** | Aluminum 10-bay Minitower, 300W PSU |
| **Fans/extras** | Two 60mm, high-output case fans, front headphone and mic jacks |
| **Mouse** | Airtouch Wireless Elite scroll mouse, RF11-GP-M |
| **Keyboard** | Airtouch Wireless Elite 104-key |
| **BUNDLE** | |

Windows XP Pro CD, 6-game bundle (Evolva, F-16 Aggressor, Icewind Dale, Jagged Alliance 2, MDK 2, Star Trek Voyager: Elite Force), Nero Burning ROM, Lotus Smart Suite 9.7, BitWare for Windows

**BOOT: 46 sec** **DOWN: 8 sec**




*Our zero-point system includes: an Intel D850MV motherboard, a 2GHz P4 CPU, 512MB PC800 RDRAM, a GeForce4 Ti 4600 videocard, and a Western Digital 1000BB hard drive (2MB cache).*

### MAXIMUMPC VERDICT

***880NF2***
POLYWELL

**AHNULD**

Blistering-fast performance, without the usual price tag.

**DOLPH**

Needs better cooling and a DVD burner.

**www. polywell.com**
**$2,150**

**8**



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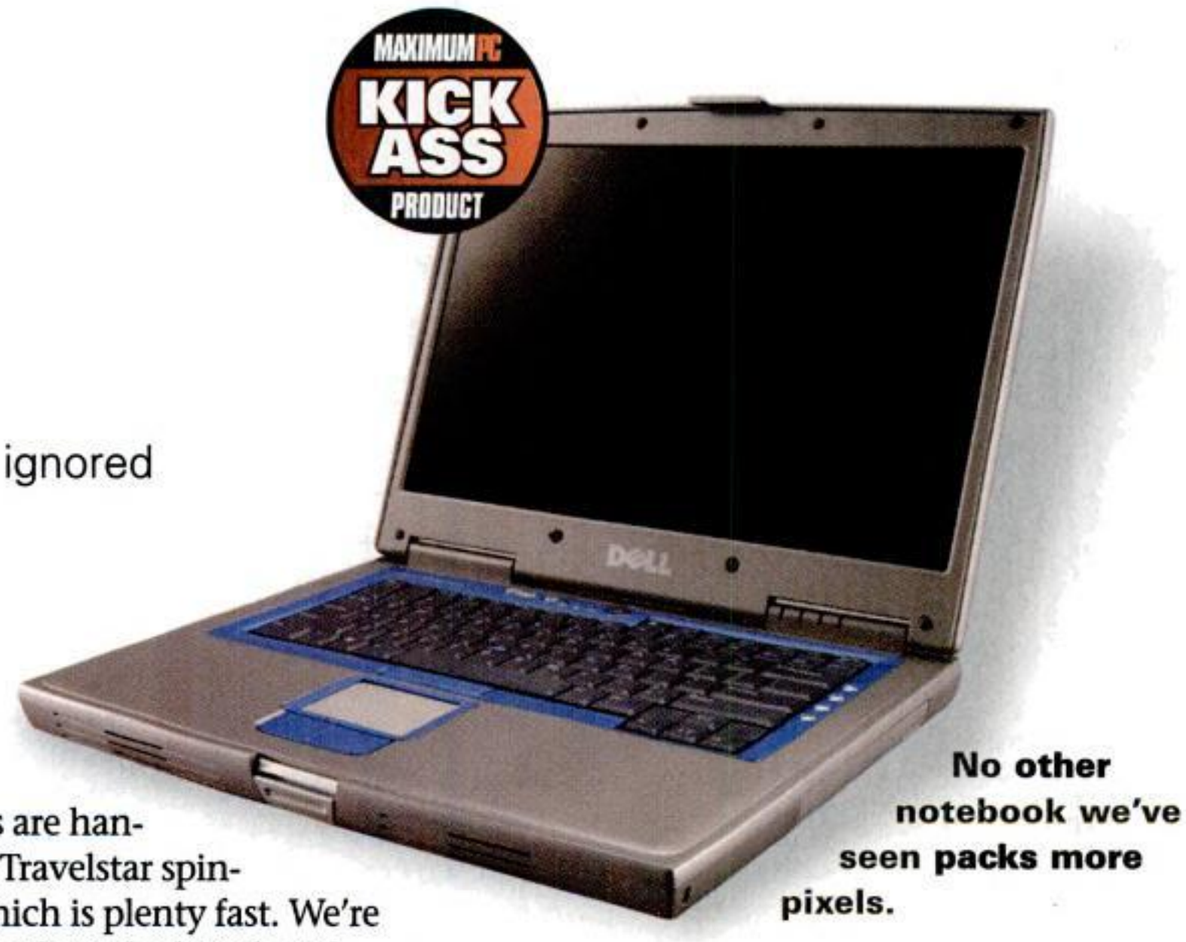
# Dell Inspiron 8500

A high-res screen and "real" GeForce4 chip cannot be ignored




**No other notebook we've seen packs more pixels.**

Dell had a tough job in updating its workhorse Inspiron 8200, but the replacement is one killer-diller. The Inspiron 8500 offers several firsts in notebook design. Let's start with the wide-aspect-ratio screen. While many will say that Apple beat Dell to the big screen, we must note that the new Inspiron features an immense resolution of 1920x1200, while the new Apple pimps just 1440x900. At 1920x1200, you're looking at a whopping 2.3 million pixels, which is good for people who need the screen real estate of a 24-inch monitor in a notebook formfactor. (But let's face it, you better have good vision to see the small type.)

The second notable breakthrough for Dell is the first appearance of nVidia's GeForce4 4200 Go mobile video chipset. Like ATI's Mobility Radeon 9000 released last November, the 4200 Go features full vertex- and pixel-shader support. While nVidia still hasn't wrested the desktop performance crown from ATI (see page 16), the 4200 mobile part looks like the clear performance leader in notebooks. In fact, for all intents and purposes, the new chipset is just a portable version of the GeForce4 Ti 4200 AGP card.

Finally, the new Inspiron boasts Intel's new 2.4GHz Pentium 4M. Though it may not hit the screaming 2.8GHz of the desktop P4s that some vendors have been stuffing into their notebooks, the mobile 2.4GHz doesn't compromise your notebook's battery life either.

On the outside, the Inspiron 8500 is no simple redress. It's a total redesign, with a new look and colors. Dell chucked the 8200's dual multi-bay capability that we so loved, but the new unit is also a bit thinner than the previous model. Two multi-bays will let you run two batteries or a second optical drive, depending on your proclivities (however, these days there's not much need for a second drive, what with 24x combo drives on the scene).

Hard drive chores are handled by a 40GB IBM Travelstar spinning at 5400rpm, which is plenty fast. We're also glad Dell stuck with its dual track pad and joystick configuration. Internally, the new 8500 runs the safe and sane Intel 845MP chipset with native support for USB 2.0.

Performance? Stupendous, and we would expect nothing less, given the notebook's config. Compared with the 2GHz Compaq 2800T we reviewed in November 2002, the Dell's 20 percent boost in CPU clock speed helped it finish our *Premiere 6.01* benchmark with a 150 second advantage. Overall, the Dell was 30 percent faster than the Compaq in this benchmark, and 47 percent faster than the aging 1.7GHz P4 Inspiron 8200 that we use as a reference point.

In *Photoshop*, the 8500 finished our *Photoshop* action script 89 percent faster than the 1.7GHz P4. Yoiks! Not every benchmark scales perfectly with clock speed, however. In *SYSmark2002*, we saw just an 8 percent increase in speed over the Compaq, and just a 32 percent increase over the 1.7GHz Inspiron.

Battery life was fair at about 136 minutes, and we actually expected more run-time considering the very large 6486mAH battery inside. In *Quake III*, the Inspiron 8500 was about 24 percent faster than our zero-point Dell (which is equipped with a GeForce 440 Go) and 18 percent faster than the aforementioned Compaq, which holds a Mobility Radeon 9000 3D chipset.

But *Quake III* doesn't always tell the whole story. In *3DMark2001 SE*, we saw the Inspiron 8500 cough up 9,079 for an overall score. This is amazing, considering that a Mobility Radeon 9000-equipped notebook armed with a 2.8GHz desktop P4 hit just 7,100—and that was with a 400MHz CPU speed advantage and a 533MHz system bus! With these numbers, it's pretty easy to declare the 8500 the fastest gaming notebook available at the moment. Props go to the GeForce4 4200 Go for making it all possible.

We would have liked more battery life, but considering the amount of hardware the 8500 powers, it's difficult to complain.

**—GORDON MAH UNG**

## MAXIMUM PC VERDICT

***Inspiron 8500***
DELL

**CASHEWS**

The 8500 boasts two exclusives: the highest-res screen we've ever seen in a notebook and a GeForce4 4200 Go.

**WALNUTS**

Just adequate battery life

**www.dell.com**
**$2398 (with 3-year warranty)**

**9**

| ZERO POINT SCORES | | INSPIRON 8500 SCORES |
|---|---|---|
| SYSmark2002 | 150 | 198 |
| Premiere 6.01 | 720 sec | 489 sec |
| Photoshop 7 | 91 sec | 48 sec |
| Audio Grabber | 549 sec | 302 sec |
| Quake III | 63.4 fps | 78.1 fps |
| Battery Test | 235 min | 136 min (-42.13%) |

0 20% 40% 60% 80% 100%
PERCENT FASTER

*Our zero-point notebook is a Dell Dimension 8200, and includes a 1.7GHz P4-M CPU, 256MB DDR266, a 64MB 128-bit DDR GeForce4 Go graphics chipset, and a 5400rpm IBM Travelstar 60H hard drive.*

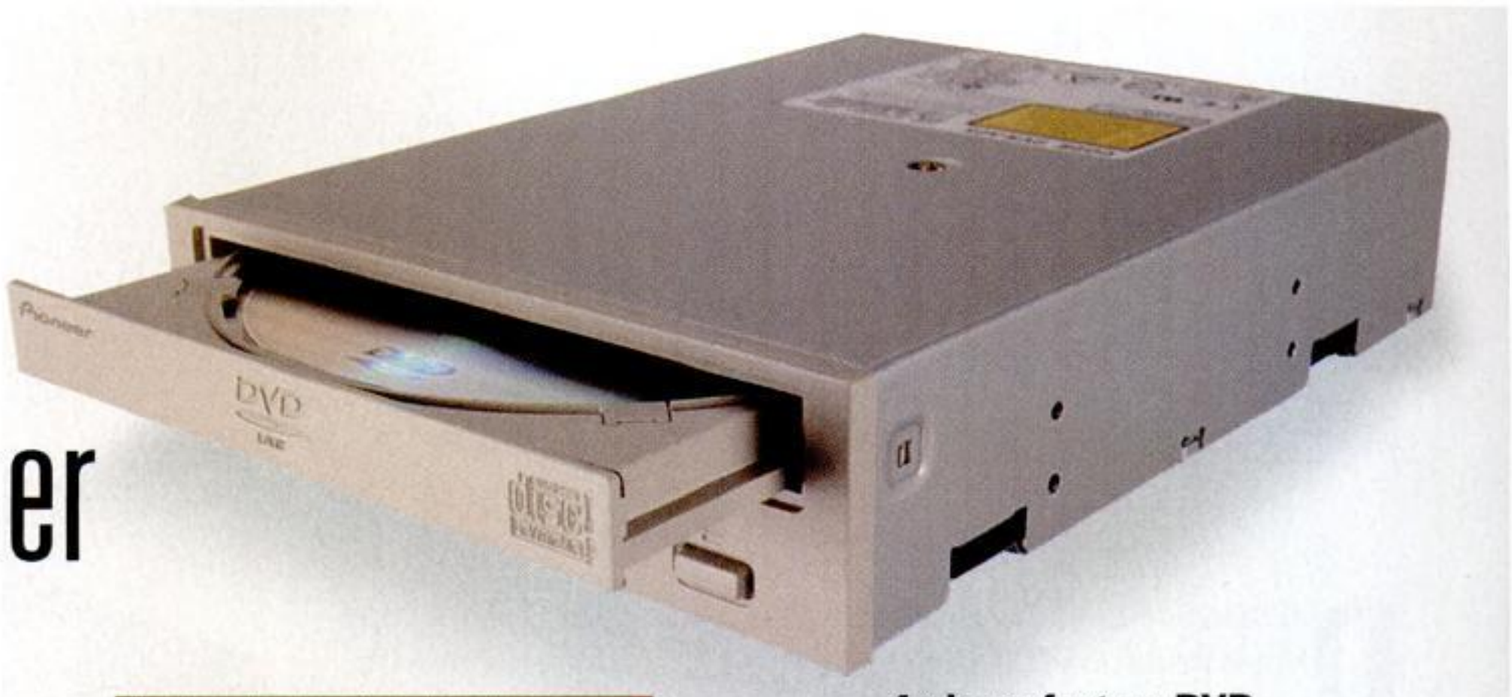
## UNDER THE HOOD

| THE BRAINS | |
|---|---|
| CPU | 2.4GHz Pentium 4M riding Intel 845MP chipset |
| RAM | 512MB DDR266 |
| I/O ports | Two USB 2.0, one 10/100 Fast Ethernet, video out, S-video out, FireWire A, one PC Card, headphone, mic in, line out |
| Modem | PCTel V.92 |
| LAN | Broadcom 440x 10/100 |
| **DISPLAY** | |
| Video | nVidia GeForce4 4200 Go with 64MB (200MHz core/200MHz RAM) |
| Display | 15.4-inches (1920x1200@32-bit) |
| **STORAGE** | |
| Hard drive | IBM Travelstar 40GB@5400rpm |
| CD-RW/ DVD-ROM | HLDS GCC-4240N (24x CD-R, 10x CD-RW, 8x DVD-ROM, 24x CD-ROM) |
| **AUDIO** | |
| Audio chip | SigmaTel AC97 |
| **TIPPING THE SCALES** | |
| Lap weight: | 7.1 pounds |
| Carry weight: | 8.1 pounds |
| **BUNDLE** | |
| Windows XP Home, Dell Picture Studio, Image Expert 2000, Intervideo WinDVD, Quicken 2002 New User Guide, Roxio Easy CD Creator 5, WordPerfect Office 2002. | |
| BOOT: 55 sec. | DOWN: 15 sec. |


Reprinted material

# Pioneer DVR-A05 DVD-R/W DVD Burner

Sometimes, it just all comes together



**4x is as fast as DVD burning gets these days, and Pioneer's DVR-A05 dishes out DVD discs faster than Sony's dual-format DRU-500A.**

MAXIMUM PC KICK ASS PRODUCT

Every geek knows better than to give cutting-edge technology to the family. It's like agreeing to provide free technical support every day for the rest of your life. And Pioneer's DVR-A05 DVD burner is definitely cutting-edge. Pioneer—architects of the DVD-R/W format—doubled burn speeds to its write-once DVD-R media, so you can now burn 4.5GB in 15 minutes. *Fifteen minutes.* Add a half-hour for simple video editing and menu creation, and maybe 10 minutes for video processing, and you've made yourself a DVD Video in less time than it takes Lenscrafters to turn out a new pair of glasses. But it's not just the speed we're celebrating here. Combine the highly set-top compatible DVD-R format, fast burn speeds, and a virtually idiot-proof software package, and you've got a third-generation burner that's not only a great performer, but just as accessible to Aunt Bea as it is to the power-user.

## THE BUNDLE

Roxio Easy CD Creator 5.3 Basic, Sonic MyDVD 4.0, ArcSoft Showbiz, Sonic CinePlayer, Pinnacle InstantWrite (packet-writing software)

## THE PIONEER REPERTOIRE

| | |
|---|---|
| **Writes to:** | |
| DVD-R | 4x |
| CD-R | 16x |
| **Rewrites to:** | |
| DVD-RW | 2x |
| CD-RW | 8x |
| **Reads:** | |
| DVD-ROM | 12x |
| CD-ROM | 32x |

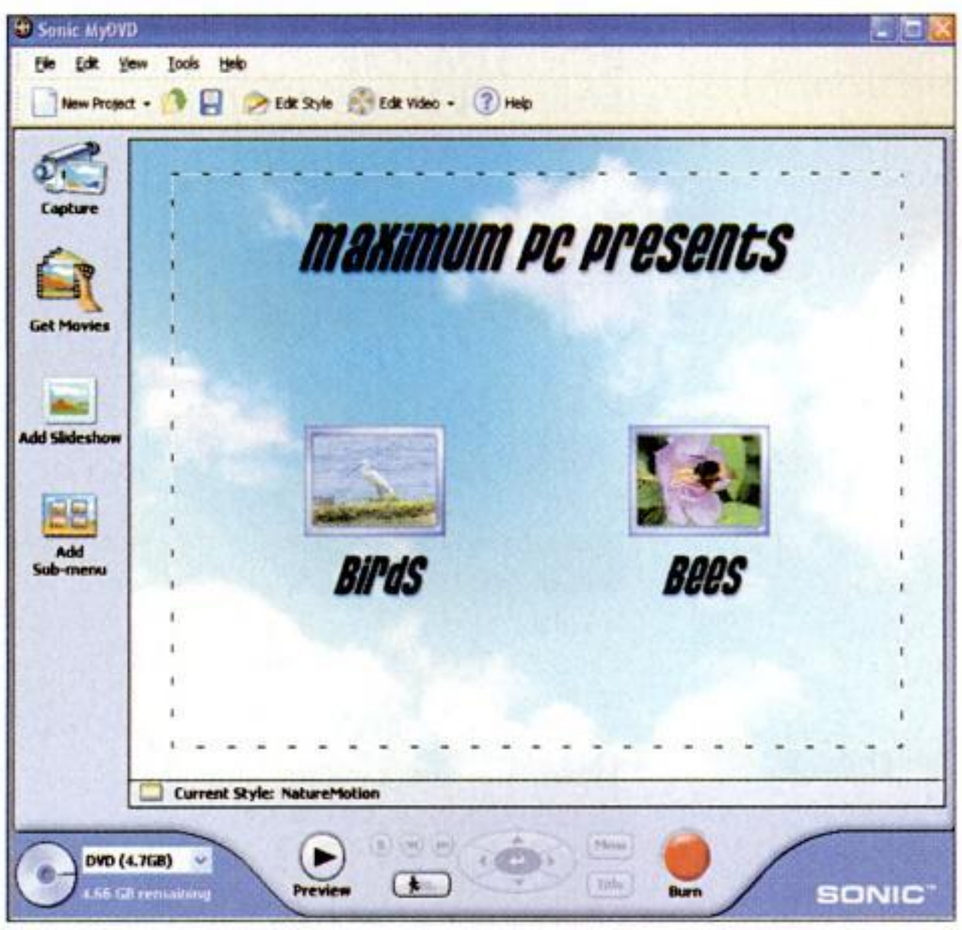
It's not just DVD burn times that got halved. Compared with the DVR-A03 (the A04 was a tiny incremental update that came with a whopping price drop), digital audio extraction plunged from 6:26 (min:sec) to 3:05 for a full 70 minute-plus CD. Unfortunately, CD burn times remain at 16x, but at this speed it still takes just slightly less than six minutes to burn a full CD. Sony's dual-format DRU-500A burns CDs at 24x, finishing the same CD in 4:27, but this differential is of concern only if you intend to use your DVD burner as your sole optical drive. CPU utilization, at 12 percent during 2x reads, was fairly minimal, which is good news for users who don't own a top-of-the-line processor.

Surprisingly, the real knockout in this package comes from the bundled *MyDVD 4.0*. A huge advancement over *MyDVD 3.5*, this iteration of Sonic's DVD authoring software nearly eliminates the headaches, frustrating interfaces, and mystifying jargon associated with DVD burning. It's no longer hysterically picky about video bitrates and sizes—it even processed multiple 800MB video files in minutes, without a hiccup. We didn't experience any crashes or mysterious error messages as we had in the past (to wit: "Error number 65335"). Gone are the craploads of cheesy menu templates. *MyDVD* instantly creates a fairly good-looking menu for you, but also allows you to customize it by stripping out the canned images and replacing them with your own. *MyDVD* can automatically create looping video menu backgrounds and buttons, which is not only a useful feature, but staggeringly impressive, if that's your kind of thing. Our only gripe is that even a fairly inexpensive package ought to let you resize or move the buttons around from their default positions. But, hey, it's the first newbie-level DVD burning app we can recommend without embarrassment or shame (or fear of being a lifelong support technician).

For $50 more, you could get the same fantastic application in Sony's DRU-500A, which writes to both recordable DVD formats (+RW and –RW), and notches up the CD write speed to 24x along the way. But the DRU-500A still writes to DVD rewriteable media at a top speed of just 2.4x.

DVD burning has never been cheaper, faster, or easier, and Pioneer's DVR-A05 wraps it all up in a single package. Pretty soon, even pets will be able to make their own discs.

**—LOGAN DECKER**




***MyDVD 4.0*—which comes bundled with the DVR-A05 drive—makes DVD burning a joy. (The dashed line represents the area viewable on normal TVs.)**

| BENCHMARKS | DVD | CD |
|---|---|---|
| Average data transfer (MB/sec) | 11.4 | 3.7 |
| Random/full-stroke seek (ms) | 122/302 | 124/285 |
| Audio extraction (min:sec) | - | 3:05 |
| Data burn (min:sec) | 14:44 | 5:52 |
| CPU utilization | 12% (2x) | 5% (8x) |

The data CD burn test uses the bundled applications to create a 647MB CD-R. The data DVD burn test uses the bundled applications to create a 4.25GB. The audio extraction test uses a commercially stamped 70:07 minute audio CD. All tests were performed using Verbatim media, except where noted.

## MAXIMUM PC VERDICT

***DVR-A05***
PIONEER

**+ CHIMICHANGAS**

Pioneer stays at the top of the pack with 4x write speeds to DVD-R, and throws in the best consumer-level DVD authoring package around.

**– CUCARACHAS**

16x CD burn times are still well behind the curve, and the rewriteable format got no speed increase.

**www.pioneerelectronics.com**
**$300**
**9**



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### AMD PROCESSORS

| | |
|---|---|
| **ATHLON XP** | |
| Athlon XP Barton 3000+ | $593 |
| Athlon XP Barton 2800+ | $378 |
| Athlon XP Barton 2500+ | $176 |
| Athlon XP 2700+ | $269 |
| Athlon XP 2600+ | $243 |
| Athlon XP 2400+ | $143 |
| Athlon XP 2200+ | $108 |
| Athlon XP 2100+ | $90 |
| Athlon XP 2000+ | $79 |
| Athlon XP 1900+ | $72 |
| Athlon XP 1800+ | $64 |
| Athlon XP 1700+ | $55 |
| **ATHLON MP** | |
| Athlon MP 2400+ | $232 |
| Athlon MP 2000+ | $164 |
| **AMD DURON** | |
| Duron 1.3 GHz | $38 |
| Duron 1.2 GHz | $33 |
| Duron 1.1 GHz | $28 |
| Duron 950 MHz | $26 |

### INTEL PROCESSORS

| | |
|---|---|
| **PENTIUM 4-Retail Box** | |
| 3.06 GHz 533FSB 512K | $599 |
| 2.8 GHz 533FSB 512K | $349 |
| 2.66 GHz 533FSB 512K | $279 |
| 2.53 GHz 533FSB 512K | $219 |
| 2.4B GHz 533FSB 512K | $179 |
| 2.26 GHz 533FSB 512K | $169 |
| 2.0 GHz 400FSB 512K | $169 |
| 1.8A GHz 400FSB 512K | $149 |
| **PENTIUM III FCPGA/2** | |
| P-III 1.4 GHz 512k | $215 |
| P-III 1.2 GHz 256k | $113 |
| P-III 1.13 GHz 256k | $110 |
| **CELERON FCPGA2/478** | |
| Celeron 2.0GHz s478 | $88 |
| Celeron 1.8GHz s478 | $74 |
| Celeron 1.7GHz s478 | $59 |
| Celeron 1.3GHz s370 | $51 |

### COOLING ACCESSORIES

| | |
|---|---|
| **COOLERMASTER** | |
| **SocketA & 370** | |
| Jumbo Aluminum Fan | $9 |
| 7k RPM Pure Cu | $19 |
| 7k RPM Cu Pipe | $35 |
| Low noise Cu Pipe | $35 |
| Univ. 80MM Case | $9 |
| **ZALMAN** | |
| CNPS 3100+ SKT A | $24 |
| CNPS 6000-CU SKT A | $32 |
| CNPS 6500B-CU SKT 478 | $41 |
| CNPS 57000-CU SKT 478 | $36 |

### STORAGE

| | |
|---|---|
| **MAXTOR** | |
| 20GB 100/7200/2MB | $70 |
| 40GB 133/7200/2MB | $79 |
| 60GB 100/5400/2MB | $85 |
| 60GB 133/7200/2MB | $92 |
| 80GB 100/7200/2MB | $102 |
| 120GB 100/5400/2MB | $144 |
| **WESTERN DIGITAL** | |
| 20GB 100/7200/2MB | $68 |
| 40GB 100/7200/2MB | $82 |
| 60GB 100/7200/2MB | $94 |
| 80GB 100/7200/2MB | $104 |
| 120GB 100/7200/2MB | $152 |
| 120GB 100/7200/8MB | $167 |
| **IBM** | |
| 40GB 100/7200/2MB | $84 |
| 60GB 100/7200/2MB | $91 |
| 80GB 100/7200/2MB | $104 |
| 120GB 100/7200/2MB | $150 |
| **IOMEGA** | |
| 250MB Internal | $69 |
| 250MB EXT USB | $134 |
| 250MB EXT PAR | $139 |

### CONTROLLERS

| | |
|---|---|
| TCW PCI ATA133 RAID | $28 |
| **PROMISE** | |
| PCI ATA133 | $35 |
| PCI ATA133 RAID | $92 |

### DRIVE COOLING

| | |
|---|---|
| PCI Slot System | $8 |
| 3.5" SGL FAN HDD | $12 |
| 5.25" DUAL FAN HDD | $20 |
| Coolermaster Alum HDD | $30 |

### CASES

| | |
|---|---|
| Midtower 350w Black | $69 |
| Enlight Mid 7237 USB | $67 |
| FullTower 300w | $77 |
| Aluminum w/Window | $191 |
| Blk Aluminum w/Window | $191 |
| **ANTEC** | |
| PLUS660AMG 330W Mini | $104 |
| SX630II 300W Mini-Tower | $73 |
| SX1040BII 400W File Server | $96 |
| SLK3700AMB 350W | $80 |
| **CASE ACCESSORIES** | |
| 80MM fan guard | $3 |
| 6pk Case thumbscrews | $4 |
| Blue Cold Cathode | $19 |
| Green Cold Cathode | $19 |

### CD-RW

| | |
|---|---|
| 48x24x48 Samsung w/DVD | $92 |
| 32x10x40 Samsung w/DVD | $76 |
| 48x24x48 Lite-On BLK | $67 |
| 48x24x48 Lite-On | $57 |
| 48x16x48 MSI Retail | $55 |

### DVD R/RW

| | |
|---|---|
| **PIONEER** | |
| DVR-A04 | $300 |
| DVD R Media 5 Pack | $25 |

**$7.95 Shipping on all items!**

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### WIRELESS

| | |
|---|---|
| **LINKSYS** | |
| WIFI USB LAN Adapter | $62 |
| PCMCIA WIFI Adapter v2.5 | $60 |
| PCI WIFI Adapter | $73 |
| WIFI PCMCIA -> PCI ADAP | $44 |
| WIFI Access Point | $109 |
| Cable/DSL Router | $115 |

### NETWORKING

| | |
|---|---|
| **SWITCHES/HUBS** | |
| 8port 10Mb | $27 |
| 8port 10/100 Switch | $50 |
| 16port 10/100 Switch | $80 |
| **NETWORK ADAPTERS** | |
| TCW Realtek 10/100 | $10 |
| 3Com 10/100 | $32 |
| Intel Pro 10/100 | $33 |
| Intel Pro/1000MT | $57 |
| **CABLE/DSL ROUTERS** | |
| Linksys 4 Port Router | $64 |
| Belkin4 Port Router | $61 |

### CD ROMS

| | |
|---|---|
| 54X Mitsumi | $26 |
| 52X Asus | $25 |
| 52X Creative Labs | $29 |
| 52X Lite-On | $23 |

### VD ROMS

| | |
|---|---|
| 16X Samsung | $45 |
| 16X Lite-On | $42 |
| 16X Lite-On Black | $47 |

### MONITORS

| | |
|---|---|
| **17"** | |
| AOC 7ELR .23hdp | $139 |
| AOC 7F .21hdp Flat | $140 |
| AOC 7E-BLK .23hdp | $153 |
| AOC 7F-SLK .23hdp | $159 |
| **19"** | |
| AOC 9GLR .21 mdp | $189 |
| AOC 9KLR .21 mdp | $223 |
| **LCD Displays** | |
| AOC 15" LM520 | $321 |
| AOC 17" LM720 | $460 |
| Cornea 15" CT1501 BLK | $362 |
| Cornea 17" MP704 BLK | $442 |
| Cornea 17" CT1700 | $434 |
| Cornea 18" CT1810 | $550 |

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### USB

| | |
|---|---|
| 64MB USB Thumb Drive | $40 |
| 128MB USB Thumb Drive | $64 |
| USB 2.0 5port PCI Card | $24 |
| USB 2.0 4port HUB | $36 |
| USB 2.0 EXT IDE Encl. | $76 |
| USB 2.0 A-to-B cable 6ft | $5 |

### VIDEO CARDS

| | |
|---|---|
| **TCW - NVIDIA** | |
| Geforce4 Ti4600 128MB 8X | $337 |
| GeForce4 Ti4200 128MB 8X | $180 |
| **TCW - Powered by ATI** | |
| **RADEON** | |
| 9000 64mb DDR | $73 |
| 9500 Pro 128mb DDR | $204 |
| 9700 Pro 128mb DDR | $373 |
| **MSI** | |
| TV Anywhere | $57 |
| GeForce 4 Ti 4200-TD8X64 | $162 |
| **ATI - Built by ATI** | |
| AIW 8500DV 64MB | $191 |
| AIW 9700 PRO 128MB | $428 |
| **MATROX** | |
| Millennium G550 32MB | $97 |
| Parhelia 128MB OEM | CALL |

### MEMORY

| | |
|---|---|
| **DDR** | |
| 256MB PC2100 | $39 |
| 512MB PC2100 | $75 |
| 256MB PC2100 REG | $61 |
| 512MB PC2100 REG | $110 |
| 1.0GB PC2100 REG | $331 |
| 256MB PC2700 | $45 |
| 512MB PC2700 | $90 |
| 256MB PC3200 | $60 |
| 512MB PC3200 | $118 |
| **SDRAM** | |
| 64MB PC100 | $20 |
| 128MB PC100 | $27 |
| 256MB PC100 | $49 |
| 64MB PC133 | $18 |
| 128MB PC133 | $27 |
| 256MB PC133 | $39 |
| 512MB PC133 | $76 |
| 256MB REG NON-ECC | $67 |
| 256MB REG ECC | $69 |
| 512MB REG NON-ECC | $87 |
| 512MB REG ECC | $92 |
| **RAMBUS** | |
| 128MB PC800 NON-ECC | $37 |
| 256MB PC800 NON-ECC | $73 |
| 128MB PC800 ECC | $51 |
| 256MB PC800 ECC | $96 |
| 512MB PC800 ECC | $244 |
| 256MB PC1066 16bit | $98 |
| 256MB PC1066 32bit | $96 |

**LIFETIME WARRANTY**

### CAMERAS

| | |
|---|---|
| **LOGITECH** | |
| Pocket Digital Camera | $102 |
| Quickcam Express | $45 |
| Quickcam Pro 4000 | $87 |

### MOTHERBOARDS

| | |
|---|---|
| **PENTIUM4 / CELERON** | |
| ***GIGABYTE*** | |
| GA-8IE533 i845E DDR | $88 |
| GA-8IHXP2 i850E 533F RDR | $172 |
| GA-8GE667PRO i845GEDDR | $133 |
| GA-85R533P SiS648 DDR | $76 |
| GA-8INXP i7205 DUAL DDR | $263 |
| ***ASUS*** | |
| P4B533E i845E 533FS DDR | $157 |
| **ATHLON / DURON** | |
| ***EPOX*** | |
| 8RDA+ NVIDIA nForce2 DDR | $108 |
| ***GIGABYTE*** | |
| GA-7VAX KT333 DDR | $89 |
| GA-7VAXP KT333 DDR | $114 |
| ***MICROSTAR*** | |
| MSI K7N2G-L NVIDIA nForce2 DDR | $126 |
| MSI KT4 ULTRA SR | $122 |
| MSI KT4 ULTRA | $105 |
| MSI KT3 ULTRA2-R | $91 |
| MSI KT3 ULTRA2 | $76 |
| ***MICROSTAR DUAL SCKTA*** | |
| K7D MASTER A760MPX | $207 |
| ***ASUS*** | |
| A7S333 SiS DDR | $74 |
| A7V333R KT333 DDR | $123 |
| A7V8X KT400 DDR | $135 |
| A7N8X NFORCE2 DDR | $155 |
| ***ASUS DUAL SCKTA*** | |
| A7M266D A760MPX | $214 |

### SOUND CARDS

| | |
|---|---|
| CREATIVE LABS | |
| Audigy MP3 5.1 | $89 |
| Audigy X-Gamer 5.1 | $89 |
| Audigy 2 | $118 |
| Audigy2 Platinum | $176 |
| Extigy | $140 |

### ACCESSORIES

| | |
|---|---|
| **MICROSOFT** | |
| Intellimouse Optical | $24 |
| Natural Multimedia Keyboard | $28 |
| Office Keyboard | $29 |
| Wireless Desktop Combo | $39 |
| **LOGITECH** | |
| Cordless Elite Duo Mouse/Keyboard | $81 |
| Cordless Navigator Duo Mouse/Keyboard | $66 |
| MX 500 Optical MSE | $44 |
| MX 700 Wireless Optical MSE | $70 |

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# Klipsch GMX-D5.1

## A swing and a miss

They sound unbelievable, they look fantastic, and through no fault of their own, they have one massive flaw that drops them from Kick Ass status to "just OK" for 90 percent of all PC users. We're talking about the new Klipsch GMX-D5.1s, the well-sculpted beauties pictured to the right and featured in the February issue "Project Predator" feature.

The GMX-D5.1s absolutely ruled in our sound quality tests. They've got all the same characteristics that made the ProMedia 5.1s our favorites for such a long time. The D5.1s produce crisp, clear sounds across the audible spectrum, and still crank out the same ear-splitting volume that we've come to know and love from past Klipsches.

Our complaint is that the GMX-D5.1s are designed primarily for consoles; they don't include the analog 5.1 inputs that have become standard for 5.1 PC speaker rigs. Instead you get stereo RCA inputs, an optical Toslink digital input, an RCA coax digital input, and that's it. This sounds great in theory, because a digital signal is better than analog, right? Wrong. In the case of PC audio, digital outputs on soundcards only output PCM stereo signals, not the multichannel Dolby Digital signal that the D5.1s need in order to shine. This means that market-leading soundcards—including the Creative Audigy 2, original Audigy, and Sound Blaster Live! 5.1—don't play nice with the new Klipschies. In fact, as far as we know, the nForce2 motherboard chipset is the only PC sound controller that outputs to Dolby Digital 5.1 in a pure digital stream.

This means that any PC user whose card doesn't encode Dolby Digital 5.1 gets a very expensive 2.0 speaker rig in the GMX-D5.1. Klipsch has included Dolby Pro Logic II support, but this technology uses the information included in the stereo stream to extrapolate rear channel surround sounds. In demos, Pro Logic II is relatively impressive, but in practice, we'd rather have Dolby Digital's discrete channels than some sketchy matrix decoding.

We'd love to give these speakers a higher score, but the current offerings in the PC soundcard market preclude this. If you have an nForce or nForce2 motherboard, or own one of the big three consoles, you can't go wrong with the GMX-D5.1s. But if you want the ultimate speaker rig for your PC—one that can do stereo and true 5.1 surround sound in games—stick with the analog-only Klipsch ProMedia 5.1s, or the analog/digital Logitech Z-680s.

**—WILL SMITH**

**They look great, but are sorely lacking the analog inputs that work with every multichannel PC soundcard on the market.**

**EXPLOSIVE BASS:** They sound really, really good, which is too bad, because most PC owners will never get to hear them at their best.

**EXPLOSIVE DECOMPRESSION:** We will never, ever endorse you paying $300 for a set of 2.0 speakers. PS Dolby Pro Logic II is nice for music, but it's no solution for games.

**MAXIMUM PC VERDICT: 6**

$300, www.klipsch.com

---

# TDK 52/24/48 CD Burner

## Is the drive with the blue fender still a contender?

Most optical drive manufacturers try to tempt rapacious geeks like ourselves by simply stamping an impressive x-speed rating on the box. Then, as an afterthought, they toss in a wispy piece of paper bearing poorly translated instructions. But TDK is a different story. Its drives have always been notable for great documentation, good bundled-in software, and fantastic performance. Nonetheless, we found a few bones to pick over this month's 52/24/48 burner, leading us to believe it may be time for a product-line overhaul.

The TDK 52x is the second drive we've received that uses full CAV writing (the first was Asus' 52x). This technology spins a disc at a constant 24x throughout the entire burning process. This should result in burn times significantly higher than those of drives that have to ratchet up their speeds during the burn process. CAV speeds at 52x are indeed faster; at 2:36 (min:sec), the latest TDK was 40 seconds faster than the Plextor 48x while burning a full 700MB CD. But, alas, the TDK was not as fast as the Asus 52x, which clocked in at 2:17.

Audio extraction also took a dive. A CD ripping time of 2:34 isn't the worst we've ever experienced while extracting more than 70 minutes of audio data, but it's not nearly the best, either (again, that honor goes to Asus at 2:05). And what a struggle the extraction was. We detected the same bug in the TDK drive that we found in Lite-On's drives (hmm…). The conflict occurs when you run *Audiograbber 1.81* (our CD ripper) on a system loaded with the *Intel Application Accelerator*. Even after we swapped in Adaptec's ASPI layer (our traditional remedy), the TDK drive audibly struggled with the disc at intervals, slowing down and spinning up. We could even hear the tussle over the din of the GeForce FX a few benches down!

That said, the TDK still posted impressive seek times of 81ms/151ms for random and full-seek, respectively. CPU utilization was somewhat high at 10 percent during an 8x read. Not good news for slow PCs.

This noisy, fitful drive is a bit of a stumble for TDK. But aside from the whine of high-speed digital audio extraction, non–power users will be delighted with the relatively zippy read speeds and superlative documentation. Everyone else should think "Plextor" and "Asus."

**—LOGAN DECKER**

**She's a beaut, but not quite the runner she used to be.**

**BENCHMARKS**

| | |
|---|---|
| **Average data transfer (MB/sec)** | 5.5 |
| **Average drive rating** | 37.6x |
| **Random/full-stroke seek (ms)** | 80/151 |
| **Audio extraction (min:sec)** | 2:34 |
| **Data CD burn (min:sec)** | 2:36 |
| **CPU utilization (at 8x)** | 10% |

*The audio extraction test uses a commercially stamped 70:07 minute audio CD. The data-CD burn test uses the bundled applications to create a 700MB CD-R. All tests were performed using Verbatim media, except where indicated.*

**THE BUNDLE**

Ahead Nero Express, Pinnacle Studio 8se, TDK Digital MixMaster, Ahead InCD (packet writing)

**THE GOOD, THE BAD, AND THE UGLY:** TDK's documentation is a model for the entire PC industry. The 52x drive clocks in around the top four or five drives we've tested.

**JUST THE UGLY:** The drive practically had a nervous breakdown during digital audio extraction.

**MAXIMUM PC VERDICT: 7**

$130, www.tdk.com



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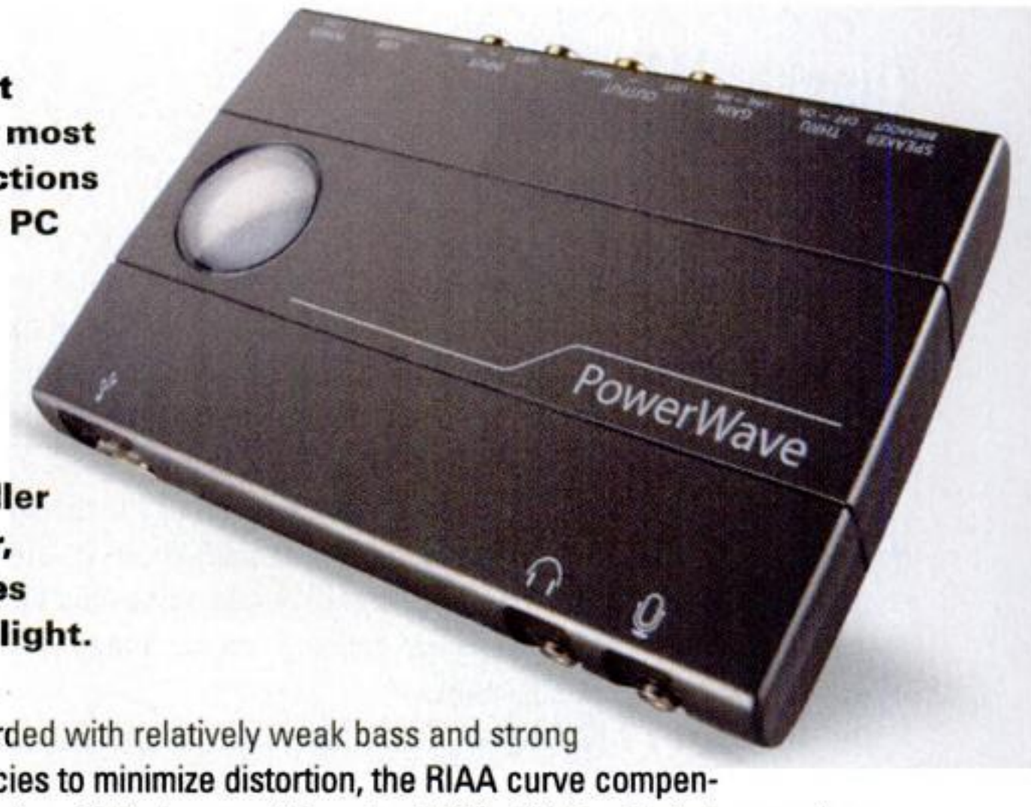
# PowerWave USB Audio Interface

## Tastes great, but is ultimately less filling

Griffin Technology bills its PowerWave as the "Swiss Army Knife" of PC audio hardware. That's a fair claim, but we think the device is like one of the smaller Swiss knives—the kind you keep in the kitchen, and use only as a bottle opener every now and then. The PowerWave is an external audio I/O device that includes speaker breakout cables, a line/mic gain control switch, and a USB connector. That's a nice array of features, but you probably don't need them if you own a Creative Labs Sound Blaster Live! External or Sound Blaster Extigy. Just like these Creative Labs breakout boxes, the PowerWave has stereo RCA connectors for piping sound in and out of your PC.

But the PowerWave does sport a few innovative features that you won't get in your current breakout box. Take the 22-watt built-in amplifier. We plugged a portable MP3 player and two unpowered Klipsch speakers into the PowerWave, and the device provided enough oomph to amplify our songs at three-quarters volume, with just a small amount of distortion. There's also a "thru" switch that allows you to record sounds to video and multitrack recordings directly, all without worrying about the latency problems that can plague PC audio recording (latency is the time it takes for audio to work its way through your PC). The PowerWave will also allow you to connect those funky Apple Pro speakers (the ones that look like googly eyes) to your PC. Of course, most PC users have real speakers, and even a subwoofer, so the attractiveness of this feature is minor.

Strangely, you can't connect a record player directly to the PowerWave and get acceptable results. The documentation explains that "turntables require pre-amplification" (which one might presume the PowerWave supplies), and also "a special equalization curve" called the RIAA curve. Because




**Although it duplicates most of the functions of familiar PC audio breakout boxes, the Power Wave is much smaller and lighter, and doubles as a night light.**

LPs are recorded with relatively weak bass and strong high frequencies to minimize distortion, the RIAA curve compensates for this signal. We have no idea why Griffin didn't add vinyl-recording prowess to its device. We've got a $25 Radio Shack pre-amp that performs the trick very nicely.

The PowerWave worked well in our Lab tests, but we'd still rather have one of the Creative Labs audio breakout boxes, which feature optical and FireWire connections.

**—LOGAN DECKER**

**SHERMAN HELMSLEY:** The PowerWave's "thru" switch is an effective way for amateur recording artistes to get around latency problems. It's handy if you don't already have a breakout box.

**LEONA HELMSLEY:** If you do have a breakout box, it's redundant. Expensively redundant.

**MAXIMUM PC VERDICT: 7**

$100, www.griffintechnology.com

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# Shuttle XPC SB51G

The lil'est PC is back with a Hyper-Threaded chipset

**Tiny and fast, Shuttle's XPC SB51G is a miniature gem.**

While the Shuttle SS51 that we slobbered over in October 2002 was undeniably awesome, some power-users turned up their noses at its SiS chipset. Well core-logic snobs can alas relax as the SB51G ups its star power with an Intel 845GE chipset.

Folks who aren't familiar with Shuttle's XPC series should know this: The bare-bones mini-systems are renowned for their small, stylish chassis, to which you add your own CPU, RAM, drives, and videocard. To boot, the Shuttle ships with a unique heat pipe that rids the case of heat before it can roast your components.

True, the 845GE's "Extreme" graphics are extreme only to the average Mac user, with performance akin to a GeForce2 MX. The real gem here is the 845GE's memory controller. Like the 845PE, the 845GE offers maximum performance for a single-channel DDR chipset. Typical specs include support for both 400MHz and 533MHz bus speeds, as well as DDR200/266/333 memory speeds. The mini Shuttle motherboard inside the SB51G supports up to 2GB of RAM, ATA100, and best of all, Hyper-Threading. Say you were so inclined: You could stuff a 3GHz P4 into the wee PC and turn on Hyper-Threading, Intel's new "two-CPUs-in-one" technology. This Shuttle also features USB 2.0 with two front and two rear ports, as well as front- and rear-mounted FireWire via a VIA VT6306 controller.

It's a wonder the Shuttle is able to support both a full-blown AGP card and a PCI card with just a 200W power supply at its disposal. We know some users fear that the Shuttles are unable to power high-performance cards like the ATI Radeon 9700 Pro. But after spending more than 12 hours at a LAN party with the SB51G and experiencing nary a hiccup, we're pretty confident 200W is more than enough juice.

We admit we're suckers for big fat tower cases, but sometimes smaller is better. If you're strapped for space or in the market for portability, the Shuttle SB51G bare-bones kit is a winner. Our only complaint is with the noise. While we were pleased with the SS51's "relatively silent" fan, the new Shuttle's capacity for a 3GHz P4 requires a more powerful, hence louder, cooling solution. That's the inevitable trade-off if you want a hopped up CPU in such a small box.

**—GORDON MAH UNG**

⊕ **MY LIL' MOBO**: Full-size performance in a shoebox.
⊖ **MY LIL' PONY:** A little noisy for its size.

**MAXIMUM PC VERDICT: 9**

$340, www.shuttle.com

---

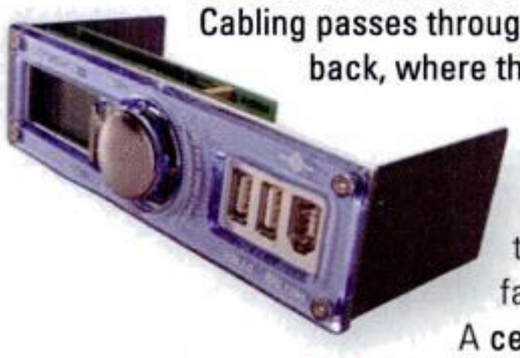
# Transfer Panel Tussle

Ins 'n' Outs for the front of your case

If you have a digital camera, external hard drive, or other portable media devices, you already know what a PITA it can be to gain access to the USB and FireWire ports in the back of your case. You might also be looking for a more convenient way to monitor system temps and control your fan speeds. Enter transfer panels—handy little control centers that fit right into a front-mounted 5.25-inch drive bay.

**—TOM MCNAMARA**

## Vantec Nexus NXP-101



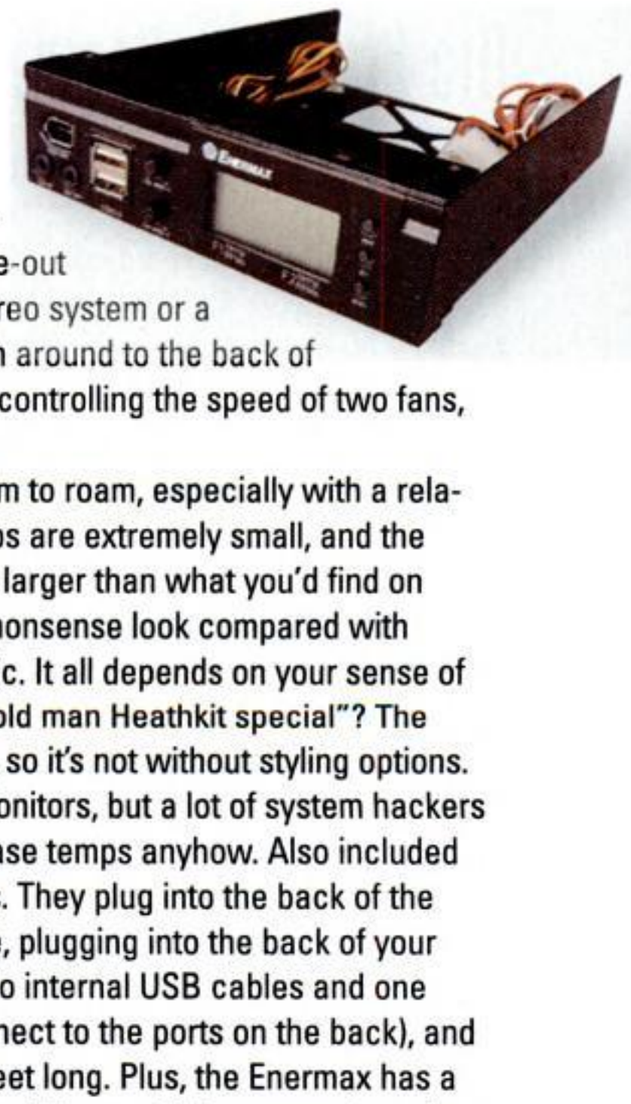
The NXP-101 provides two USB 2.0 ports and one FireWire port. Cabling passes through the inside of your computer, and out to the back, where the cables plug into your existing rear ports (make sure you have FireWire support!). This installation method requires an empty PCI slot in the back of your box, because you'll be putting the cables through the space where a PCI faceplate would otherwise reside.

A centralized knob controls the speed of up to two fans; you toggle between the fans by hitting a sizable button next to the knob. Right next to the button is an LCD that can be toggled between viewing your CPU temperature, your case temp, and the temp of one of your hard drives. Or you can place the three included thermometers on whatever components you like. The NXP-101 plugs into a standard four-pin connector.

The one drawback to this otherwise quality setup is the lengths of all the cables. A full-tower case might require three-foot USB and FireWire cables, but the kit's cables are two feet long. So, at the very least, we wouldn't recommend installing the Vantec in the top 5.25-inch bay. Also, the chromed plastic buttons look cheap, but we appreciate the inclusion of three different colored face plates. There's nothing really "wrong" with the kit, but we'd prefer to pay more and get more features in return.

**MAXIMUM PC VERDICT: 7**

$40, www.vantecusa.com



## Enermax A07FATR2

Like the Vantec NXP-101, the Enermax sports one FireWire and two USB 2.0 connectors. But it also includes line-in and line-out audio jacks, allowing you to connect a stereo system or a portable CD player without having to reach around to the back of your PC. Also, instead of a single knob for controlling the speed of two fans, functions are divided into separate knobs.

In a 5.25-inch bay, there isn't much room to roam, especially with a relatively large LCD display. The Enermax knobs are extremely small, and the Mode, Set, and Reset buttons aren't much larger than what you'd find on a wristwatch. Still, the Enermax has a no-nonsense look compared with Vantec's iMac-style colors and clear plastic. It all depends on your sense of aesthetics. Do you want "bling-bling" or "old man Heathkit special"? The Enermax comes in black, silver, and beige, so it's not without styling options.

The panel comes with just two temp monitors, but a lot of system hackers will only be paying attention to CPU and case temps anyhow. Also included are color-coded line-in and line-out cables. They plug into the back of the panel and wind out to the back of the case, plugging into the back of your soundcard. As with the Vantec, you get two internal USB cables and one internal FireWire (all of which have to connect to the ports on the back), and the Enermax cables are all at least three feet long. Plus, the Enermax has a pass-through power connection, so you won't lose a Molex connector when plugging it in. Unfortunately, the fan connectors extend only 13 inches beyond the bay. Good thing extension cables are cheap at your local computer shop.

**MAXIMUM PC VERDICT: 8**

$35, www.maxpoint.com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# Copernic Agent Pro

## Frivolous in concept, but useful in nature

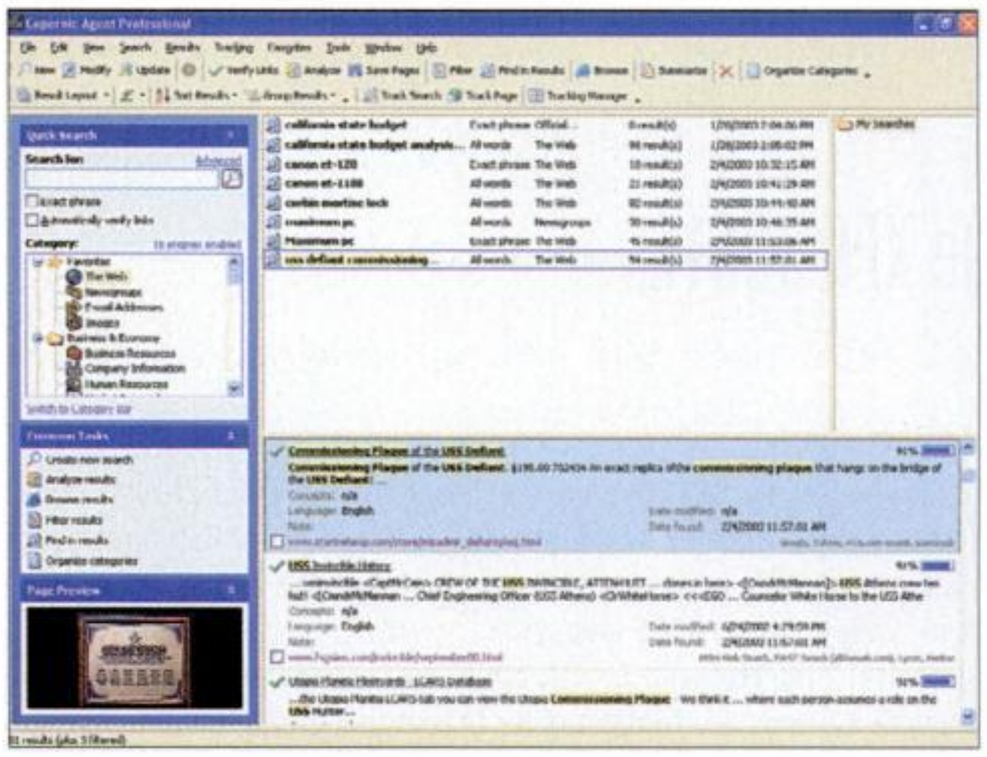
Copernic *Agent Pro* bills itself as the ultimate tool for "search professionals." Call us skeptical, but we think you'd have to be one hell of a serious web surfer to spend $79 on something that sounds like little more than a glamorized front-end for Google. You'd pass right by Copernic *Agent Pro*, wouldn't you?

Well, as it turns out, *Agent Pro* is actually a valuable tool for finding things that are tucked away in Internet crevices. The interface is as straightforward and no-nonsense as a John Wayne monologue. Want to search through 20 web engines at once? Just punch in the info you're looking for, and send *Agent Pro* on its dogged way. Once the software returns its results, you can have the app check the links to make sure they're still valid, or summarize the results.

*Agent Pro* offers numerous topics organized by category: web sites, newsgroups, e-mail addresses, domain names, government information, company information, and PR/events. The delineations help in narrowing your search parameters from the get-go. There's also the ability to localize searches by certain countries, such as France or the United Kingdom.

There are also some particularly advanced features, such as the ability to track web pages for changes and have the program notify you by e-mail when changes occur. For parents, there's a kids category that appears to be an effective smut filter. We fired it up, and were surprised to find no information whatsoever on Asia Carrera.

We found the software's searching abilities to waver between incredibly accurate and just plain bad. Of course, it really depends on what you're looking for, and what search engines are available. Copernic claims to have access to more than 1,000 search engines, and automatically updates when new search engines become available.



**Release your inner nerd with the most detailed searching reports imaginable.**

As journalists, we find the software to be useful, and we think it will appeal to any information junkie who needs to find information quickly and without a lot of scrambling. Let's put it this way: It certainly adds more depth than the average Google search, but we probably wouldn't buy it unless our company agreed to foot the expense.

**—GORDON MAH UNG**

**MC SEARCH:** Let's you tap numerous search engines with a single client. Offers an incredible amount of control over searches.

**STAR SEARCH:** Some categories are a little lightweight. Price seems a bit high considering that Google is so useful and costs nothing.

**MAXIMUM PC VERDICT: 8**

$79, www.copernic.com

# Bio Proximity Security System

## Where 'security' is spurious and just for the curious

Biometric security on desktop PCs has always been a joke. You repeatedly press your finger on the sensor to no avail, but when a rhesus monkey scampers over it, the little dickens accidentally gets full access to your system. Now AccessDenied Systems is taking a more innovative approach, using a combination of fingerprint recognition and a card with an RF transmitter. When you step away from your system, the Bio Proximity automatically locks down your PC until it senses your card's presence and you press your index finger against the print reader..

But biometric security is still a joke.

Let's start with the installation. The box we received came with no printed manual. The only documentation was on the CD. On it we found two PDF documents with vague titles—neither of which said "setup." The situation was moot, however, as one of the documents wouldn't open at all. The other one had the instructions.

After installing the base unit, called the "Hamster" for some unknown reason, we started up the installation package. We were greeted with a demand to activate the software by calling a telephone number, followed by the words "Central Time." Never a good sign. We called, and got our activation number after giving up our telephone number. We didn't like where this was going, so instead of using the security on one of our workstations, we decided to reinstall it in the Lab. The software generated a new "System ID" number for us, and wouldn't accept our old code. When we called back for a new number, at 4pm *central time*, we got an answering machine. No option for an operator, and pressing 0 simply restarted the message. Where was everybody? Late lunch? Doing team-building exercises? Filling orders for Maxwell Smart?

**This here's a lot of hardware for a "security" system that can be foiled with a reboot.**

Anyway, the fact that the RF card actually worked didn't really make much of a difference to us. We defeated the security simply by rebooting into Safe Mode. After that, we even eliminated all traces of the software simply by using System Restore. Regardless, you can set a proximity distance of three to 30 feet to determine when the PC should lock up, thus requiring the RF card and a fingerprint ID.

Cubicle types who have payroll spreadsheets open to prying eyes might appreciate this product, but what company wants to install anything that must be activated by telephone at each station? And paranoiacs won't sleep better knowing that a reboot can foil the system. But, hey, at least monkeys don't know about Safe Mode.

**—LOGAN DECKER**

**SALT AND PEPPER:** May deter extremely casual office pranksters. Looks intense and intimidating.

**PEPPER SPRAY:** We've made our point. Stay away from this product.

**MAXIMUM PC VERDICT: 3**

$330, www.accessdeniedsystems.com



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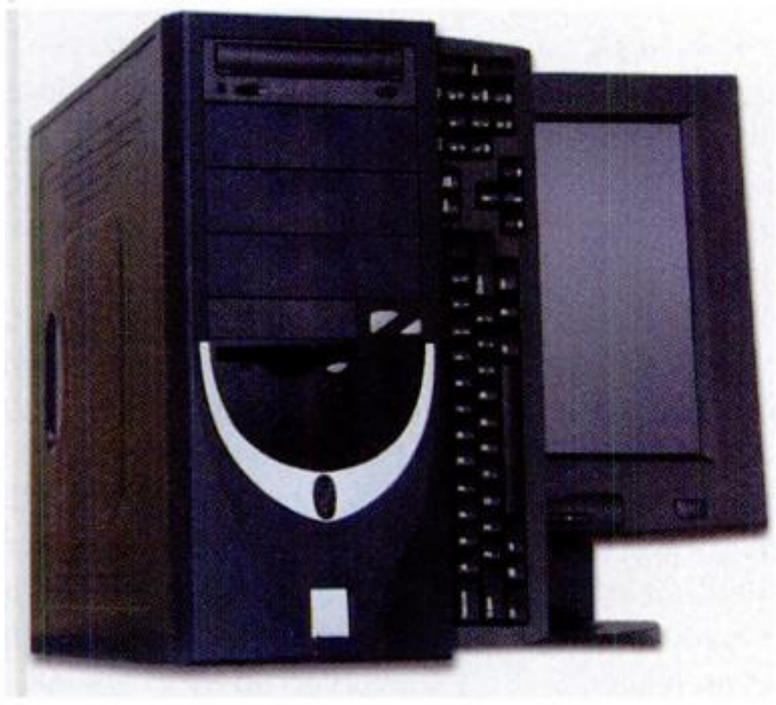

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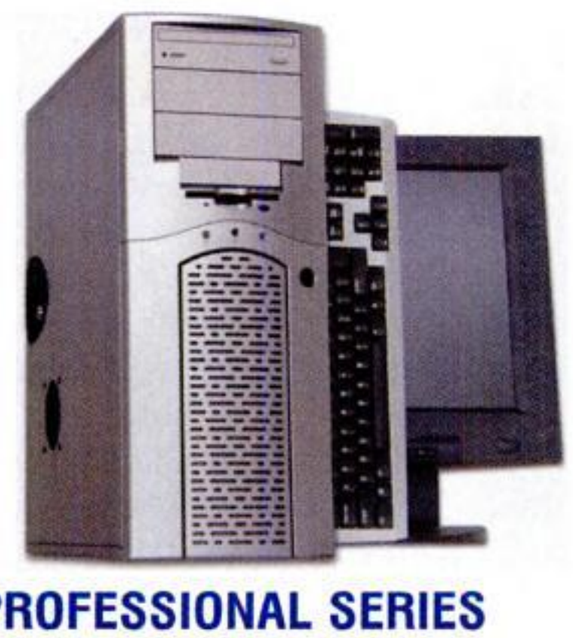

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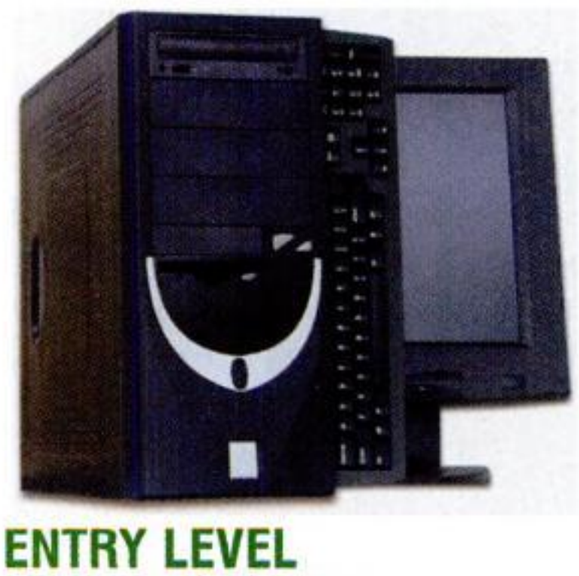

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# Tom Clancy's Splinter Cell

## Walk softly and carry a slippery garrote

**High-tech terrorists threaten world peace. Two secret agents have disappeared. Guards are swarming. And then it rains.**

The term "high concept" is crude but effective shorthand used to convey the essence of something without actually explaining it. Sometimes it works. Sometimes it simply raises more questions.

With Tom Clancy's *Splinter Cell*, the high concept leaps right off the box, wraps a garrote around your neck, and chokes you, silently, in the shadows while whispering "I am *Metal Gear Solid* meets *Rainbow Six*" into your ear. Assuming you've played both those games, this seems to say a lot. Yet using the term "high concept" to describe *Splinter Cell* misses the point entirely.

*Splinter Cell's* appearance on the Xbox last year was simply galvanizing. It was shocking that the action shooter genre—so familiar and so hard to do right—was reinvented on a console system that could claim precious few breakout moments up to that point. Even *Halo*, the flagship Xbox title, was simply a very good FPS. But *Splinter Cell* is something different. Sure, it has elements of *Metal Gear Solid*. It has the third-person perspective. It emphasizes stealth. It has a hero in a skintight suit.

**Sam waits for a telltale shadow through the blinds to indicate that a guard has taken a potty break.**

But, it would be more appropriate to describe *Splinter Cell's* place in relation to the rest of the Clancy franchise. Developed by Ubi Montreal rather than Red Storm, *Splinter Cell* reduces the team-based, first-person covert ops of tactical shooters like *Rainbow Six* and *Ghost Recon* to solo espionage and a third-person perspective. The lone operative is Sam Fischer, part of a new top-secret intelligence operation dubbed Third Echelon. Though he's supported by a remote team, Fischer works alone in a series of missions centered on unrest in the former Soviet Republic of Georgia. It's the usual Clancy brew of geopolitical intrigue and cutting-edge weaponry.

Narrative, however, is not the core appeal of the game, and this further sets it apart from the *sturm und drang* of *MGS*. At its heart, *Splinter Cell* is a suspense game, and one of the most effective ever done. Each level begins with Sam's insertion into an elaborately detailed mission zone (nine in all). These are huge, multilayered locales (such as an oil rig and an embassy), and there's certainly no shortage of gameplay. Sam's ultimate goal is to get through each mission and accomplish his goals (primarily gathering information, but also some rescue and demolition) without ever being detected. Our op's loadout is minimal: two guns (one barely used), night vision, different cameras and listening devices, and some explosives. It is theoretically possibly to get through the entire game without killing a single person. It's unlikely, but it's possible, and for some this will prove an irresistible challenge.

Sam accomplishes his covert missions by sticking to the shadows, observing the regular movements of guards and the layout of cameras and security devices, and moving from point to point quietly and carefully. To do this, he has been gifted with a simply astonishing range of control. We've all seen characters move in third-person shooters, but never like this. He can do the usual crouch, climb, duck and roll, jump, and peek around corners. We expect that. But he can also rappel down walls, use a zip line, go hand-over-hand across pipes, and perform one of those wacky Jean-Claude Van Damme split jumps, lodging himself near the ceiling in a tight hallway while guards walk by underneath. He can drop from these higher positions into attacks, and even shoot while rappelling and hanging. The animation of all his actions is smooth and well-nigh flawless.

To control such range of motion, the Xbox controller was used to great effect, with the two directional sticks working in tandem. The standard PC action game preference for keyboard and mouse is far less effective, and requires far more practice.

Also deserving of scrutiny are the graphics. The developers used a modified version of the *Unreal* engine, which works minor miracles with light and shadow, probably the two most important visual elements in the game. It looks and performs remarkably well on the Xbox. On the PC, the res levels go up to 1024x768, and with full details flipped on, even a high-end rig (2.4GHz P4, GeForce4) begins to feel the burn a bit. But with shadows and details knocked down to medium, 1024x768 performs much better, and 800x600 is smooth as buttah. The graphics look as good as the Xbox version, and the content is identical.

It's difficult to say how PC gamers will react to *Splinter Cell*. It's a different kind of experience, and the controls require a different set of skills, but the payoff is well worth the effort. *Splinter Cell* isn't a fast-paced, noisy game. It's quiet. Very quiet.

So quiet, you barely notice the wire as it tightens around your neck.

**—THOMAS L. MCDONALD**

**MAXIMUM PC VERDICT**

***Splinter Cell***
UBISOFT

**+ SILENT BUT DEADLY ASSASSINS**
Incredibly suspenseful, interesting missions. Beautiful use of shadow and light, which is integral to gameplay. Remarkable range of control.

**– SILENT BUT DEADLY BODILY FUNCTIONS**
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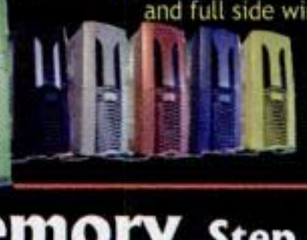

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| WD | 120GB | 7200rpm | ATA100 | WD1200JB | $162 |
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| PNY | VCQ4750XGLBLK | Quadro4 750 XGL 128MB 4X AGP | $347 |
| PNY | VCQ4900XGLBLK | Quadro4 900 XGL 128MB 4X AGP | $504 |
| PNY | VCQ4980XGLBLK | Quadro4 980 XGL 128MB 8X AGP | $549 |
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| 52x24x52 | IDE | Lite-On LTR5224 | | $68 | $83 |
| 52x24x52 | IDE | BenQ 5224P | | $68 | $83 |
| 52x24x52 | IDE | Pacific Digital U-30146 | | $80 | $95 |
| 52x24x52 | IDE | Sony CRX220A1 | | $84 | $99 |
| 40x12x40 | SCSI | Plextor PXW4012TS/SW | | $212 | $227 |
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| 16x/40x | IDE | Pioneer DVD Slot DVD106 | $64 | $79 |
| 16x/40x | IDE | BenQ DVD1648A | $50 | $65 |
| 10x/40x | SCSI | Pioneer DVD305S | $104 | $119 |
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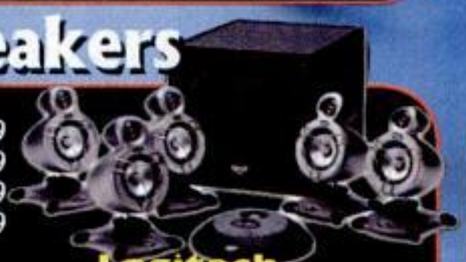

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The perfect hub for mobile computing! This tiny MicroHub™ is so small and lightweight, you'll always have room to bring it along and you can't forget the cable because its built-in. This Plug-n-Play unit features a data transfer rate of up to 12Mbps, and LED indicators for power and upstream connections.

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These CD-Rs combine a cool retro look with the rugged quality and high-performance of today's CD-R technology. Archive your cherished LP collection, burn a personal music mix or make a memorable business presentation. These CD-Rs are a blast from the past with a look toward the future!

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*Press the "Kick-Out" lever to eject disk for easy removal*

*Clips hold disk securely and prevent it from falling out*

*10-pack w/4 colors of kick out levers*

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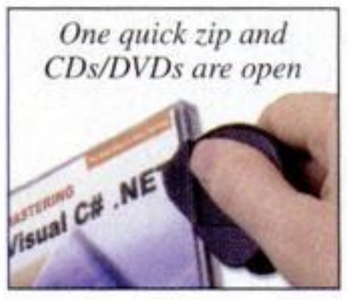
Finally! An easy, simple way to open the factory seal and shrink wrap on CDs & DVDs. A quick swipe with our opener and you're listening to your CDs or watching your DVDs in no time!

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*Small Kit:*
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*Copper radiator*

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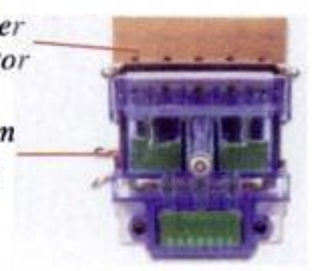

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*for 3.06Gh CPU*

*You can see the coolant rapidly circulating through the system*

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*for 2.4Gh CPU*

*Aluminum heatsink contains water pump*

- For P4 (Socket 478) motherboards
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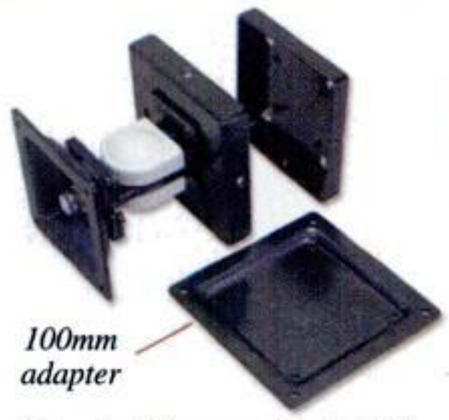

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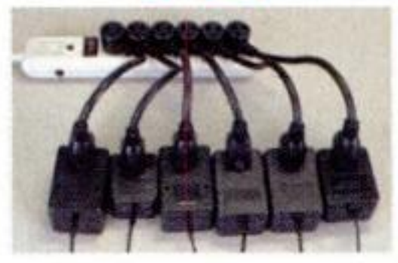

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*Chimney directs warm air up and away from the intake vent*

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Make the airflow through your PC more efficient and your system quieter by routing cool air directly to your CPU from outside your case instead of just recirculating the warm air inside and a simple chimney vents hot air up and away from the intake.

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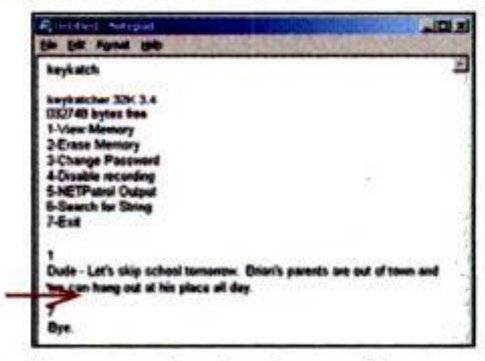


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Hyper-Threading Technology · AGP 8X · Dual Channel DDR 400+

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* Recommended DDR400 memory modules are listed in GIGABYTE website

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GA-8IKX "CHIP Tip" CHIP Aug. 2002, Romania
GA-8IKX "Lab Winner Award" PC Authority Aug. 2002, Australia
GA-8IKP "Editor's Choice" Motherboard.org, website Aug. 2002, U.S.A.
GA-8EKP "Editor's Choice Gold Award" AnandTech, website Aug. 2002, U.S.A.
GA-8IKP "Editor's Choice Silver Award" VR-Zone, website Aug. 2002, Singapore
GA-8IKP "Recommended" Dos-V Aug. 2002, Japan
GA-8IKP "Recommended" Clube do Hardware July 2002, Brazil
GA-8IKP "Editor's Choice" Tomshardware, WWW July 2002, U.S.A./ France
GA-7VKP "Excellence features" Extreme, WWW Jun. 2002, U.S.A.
GA-6VXE "Best 5/5 Award" Pcstarline, WWW Jun. 2002, Hungary
GA-8IKP "Pc Pro Labs Winner" Pc Pro Jun. 2002, UK

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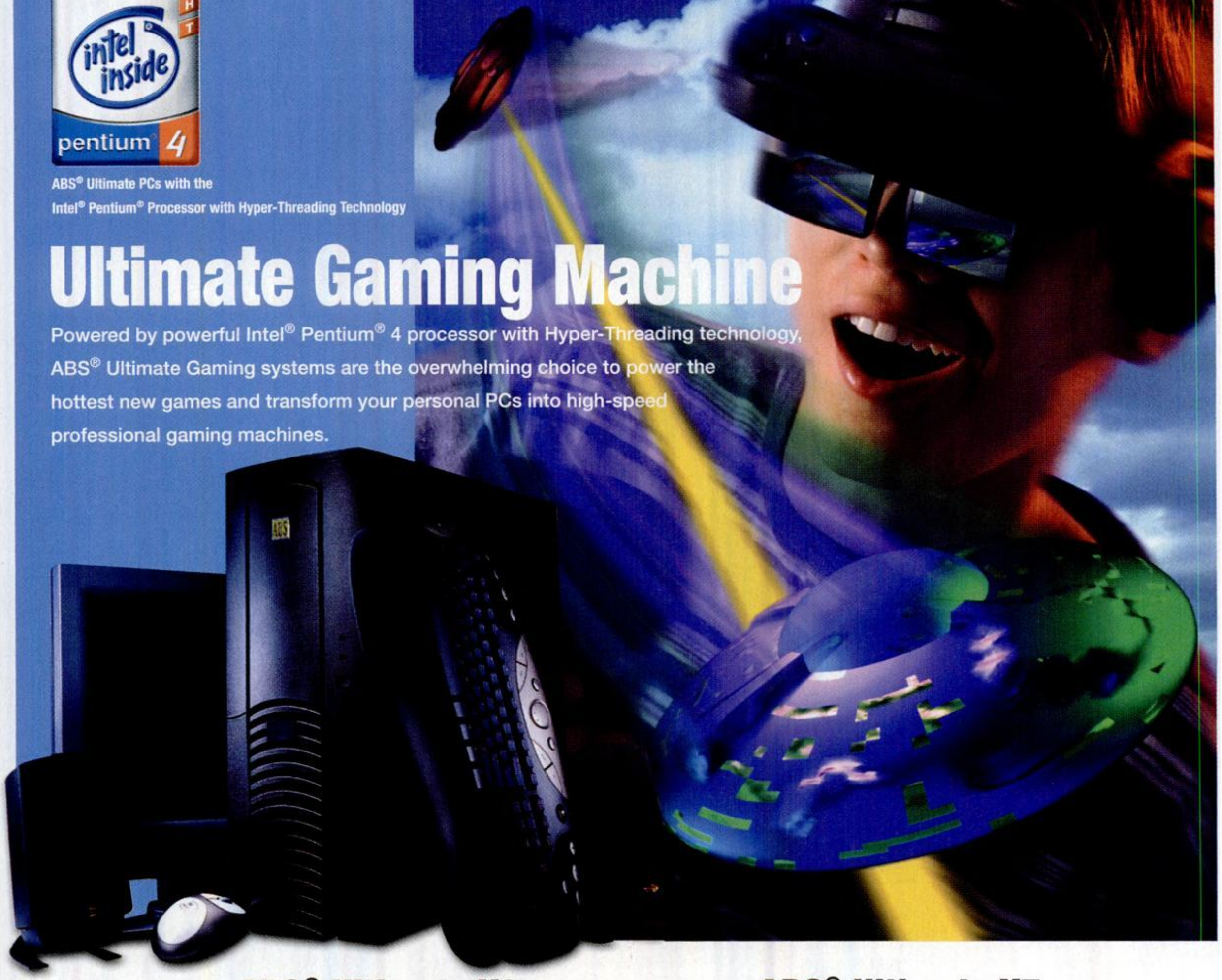

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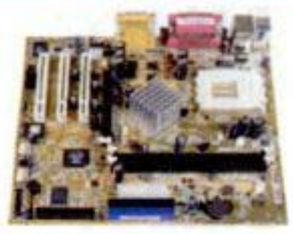

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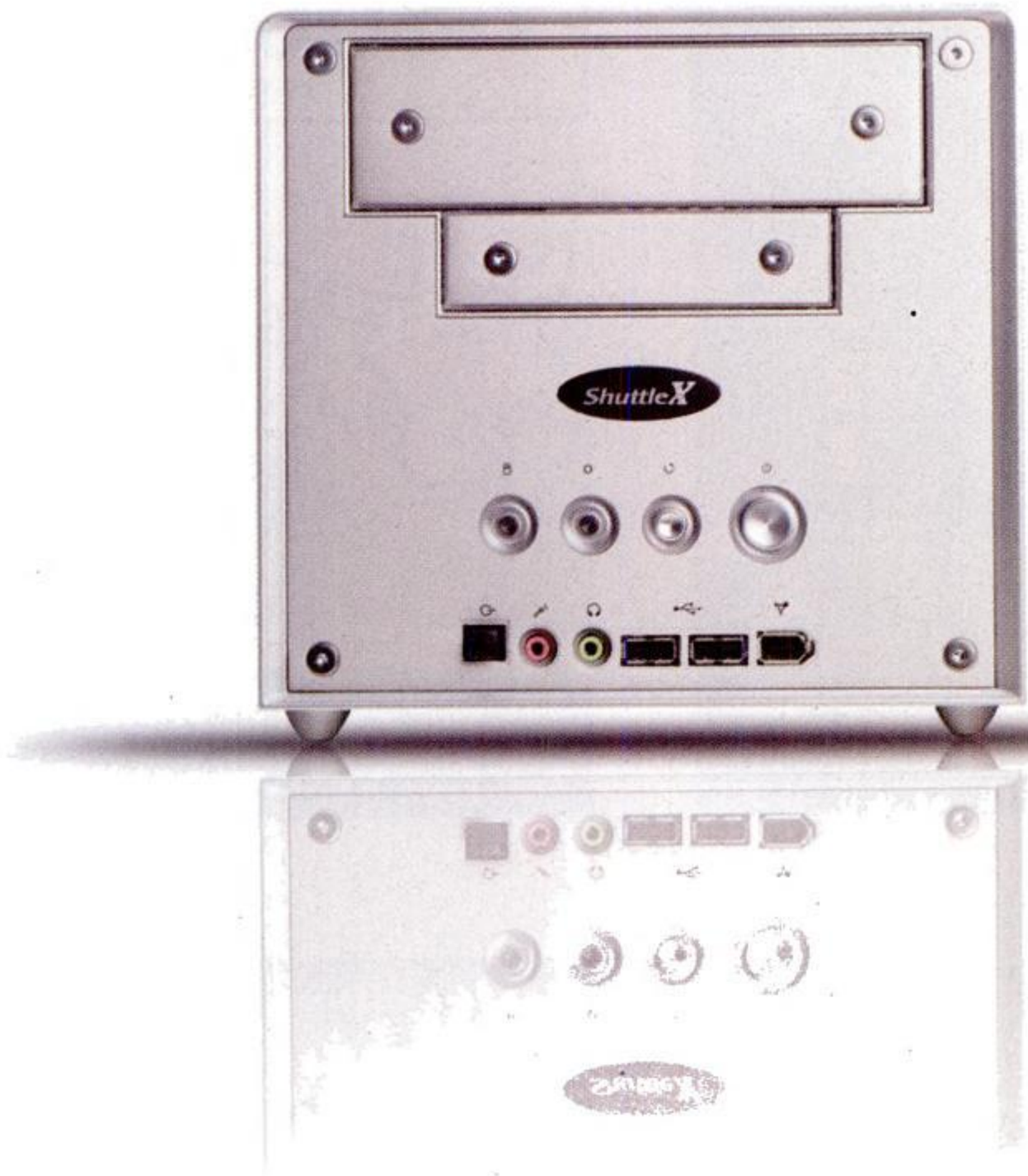


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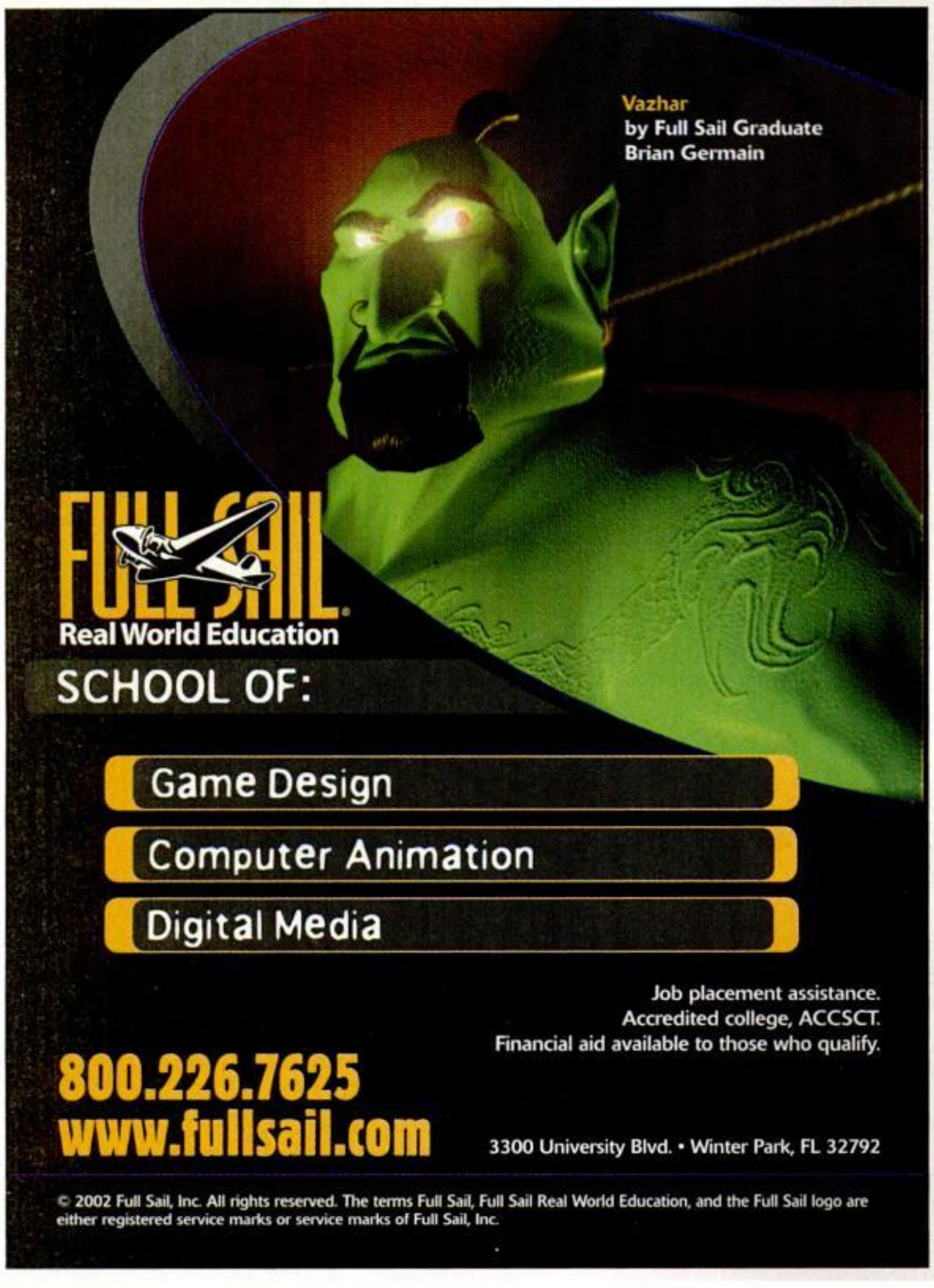
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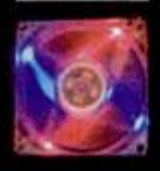

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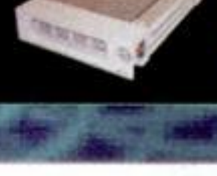

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# MAXIMUM PC Rig of the Month

## THIS MONTH: Jerami Campbell's Mini Lan Party Rig

**On a bet, Jerami Campbell took the smallest case he could find (a $30 X-Case, to be precise), and transformed it into his LAN-party companion. Indeed, it holds all the equipment necessary for competitive group gaming, yet remains imminently portable. And that's just the half of it! From its faux rust finish, to its peripherals nook, to its clevèr concealment of unsightly wires, this is a DIY project that would do a master craftsman proud.**

Jerami is modestly nonchalant about his accomplishment: "I didn't think it would be popular. It took me 14 hours at most, and only ran me $50 for the case, paint, and supplies needed to piece the face together." But we know for a fact that lesser modders wouldn't have such an easy time of it.

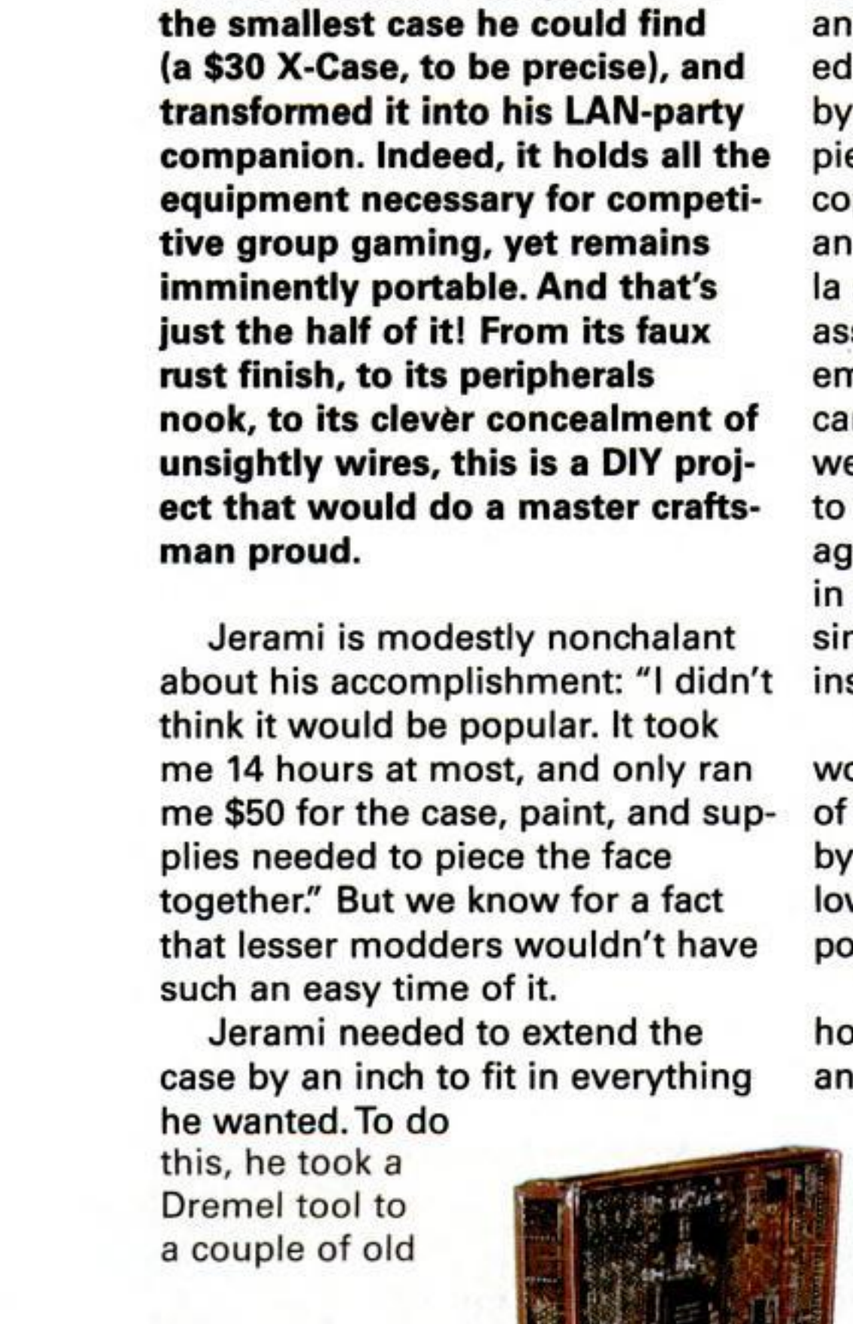
Jerami needed to extend the case by an inch to fit in everything he wanted. To do this, he took a Dremel tool to a couple of old Asus motherboards, and then constructed a new case face by joining the mobo pieces together with copper channeling and a soldering iron (a la stained-glass assembly). The three empty drive bays that came with the case were promptly removed to make room for a storage space (a luxury even in full-size cases), and a single vertical bay was installed in their stead.

The rig's weathered and worn appearance comes courtesy of an iron-based paint job, followed by a solution that rusts the iron, followed by a seal that protects against potential rust stains and toxins.

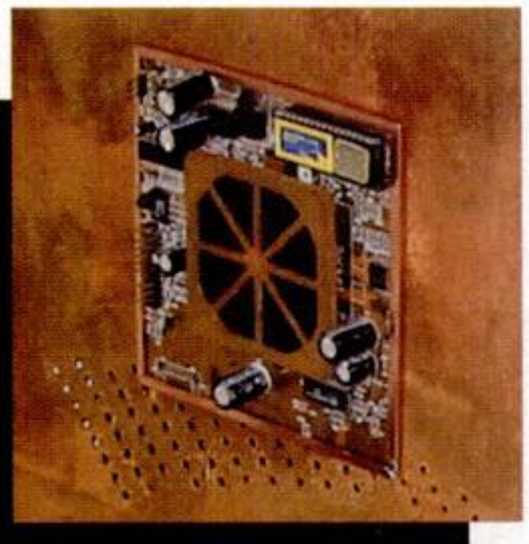
All told, the cozy quarters house an Asus A7S333 mobo, an AMD XP 2200+, 768MB of PC2100 DDRAM, a VisionTek GeForce4 Ti 4200, a Sound Blaster Live!, a D-Link NIC, a Maxtor 60GB 7200rpm HD, a Lite-On 48x burner, and a NetGear five-port network switch, with room in the storage space for peripherals and a snack!

For more details on this case, visit **www.lucentrigs.com.**

**All packed and ready to go, the rig weighs in at a most manageable 35 lbs.**



**A custom-built cubby holds Jerami's Virtually Indestructible Keyboard, Microsoft Intellimouse Explorer, Nostromo game pad, and a pair of headphones.**



**This square of mobo was home to a processor back in the day. Now it adds flourish to a custom fan vent.**

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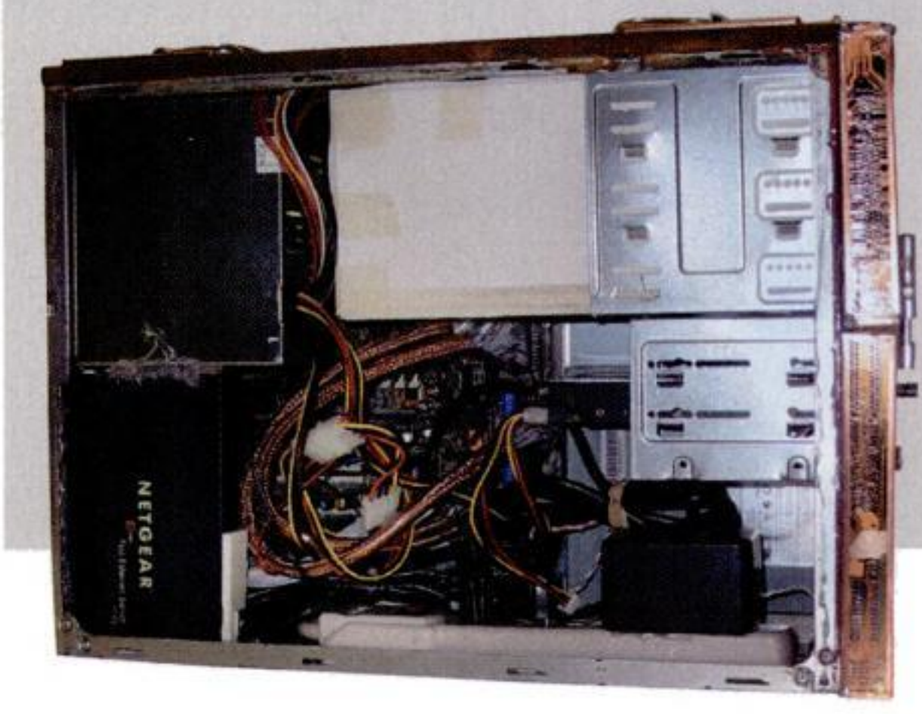


If you have a contender for Rig of the Month, e-mail **input@maximumpc.com** with pics and a brief write-up.



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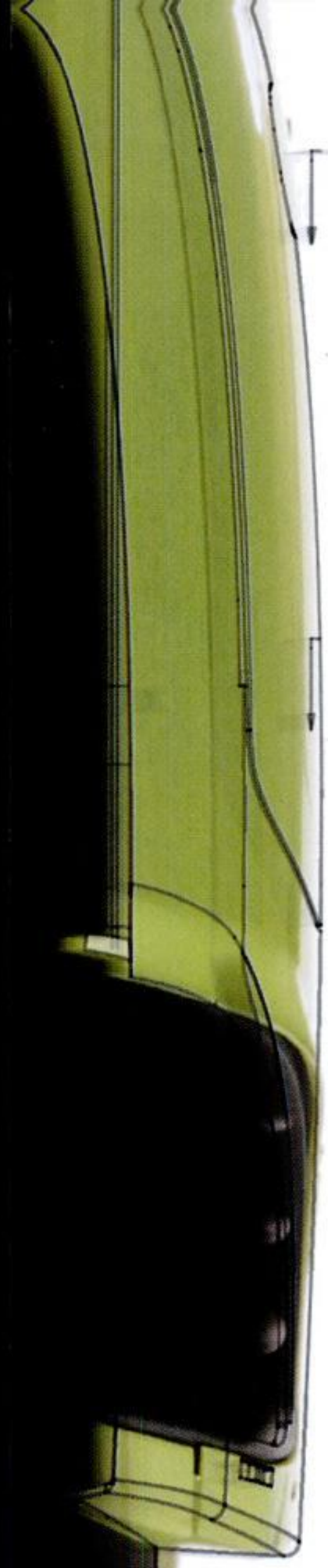

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- 533 FSB and 512KB Advanced Transfer Cache
- Intel® 845MP+ ICH3M Chipset Motherboard
- ► Corsair® 512MB PC-2700 DDR SDRAM
- ► 15.0" UltraXGA+ Enhanced TFT Active Matrix LCD
- ► ATI® Mobility RADEON™ 9000 PRO 128MB DDR with Dual-View Display Monitor and TV-out
- 60GB 5400RPM Ultra ATA100 Hard Drive

High-Performance Heatsink/Cooling with Arctic Silver III
Removable 3.5" Floppy Drive 1.44MB
Removable 24X/10X/24X CD-RW/8X DVD Combo Drive
Sound Blaster® PRO Compatible with Wavetable
5.1 3D Surround Sound with S/PDIF Digital Output
Front Panel Audio DJ CD Player
Allows CD Play While System is On or Off
One Type II PCMCIA Slot
Four USB 2.0 Ports and One IEEE 1394 Port
Infrared Wireless Fast IR Interface
► Integrated Wireless 802.11A+B Combo Mini-PCI Card
10/100Mb Ethernet LAN and 56K Modem
Dimensions: (H) x (W) x (D) : 1.7" x 13" x 11.4"
Weight: 7.6lbs. without battery
► Exclusive Metallic Majestic Blue Chassis
Exclusive 120-Watt A/C Adapter
Microsoft® Windows® XP Home Edition
1-Year Toll-Free 24/7 Technical Support
with Aliencare Depot Service

AlienAdrenaline: Video Performance Optimizer
AlienAutopsy: Automated Technical Support

Personalized Owner's Manual
FREE Exclusive Alienware® T-Shirt
FREE Custom Alienware® Mouse Pad
Optimized & Configured for High-Performance

**$3,099.00**

### MOBILEGAMING

The Area-51m™ represents the first fully capable mobile gaming solution. The performance requirements of today's most cutting edge games have been simply too demanding for a mobile system, until now. The Area-51m™ plays games at blistering speeds, handles quick motion with incredible accuracy, and performs phenomenally high in benchmarks. Perfect for LAN parties and for those who simply can not part from their desktop system's performance, the Area-51m™ is the ultimate mobile gaming machine™.

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# ahead of the game.

**AREA-51™**
**DESKTOPGAMING**

Intel® Pentium® 4 Processor with HT Technology 3.06GHz
533 FSB and 512KB Advanced Transfer Cache
Intel® 850E Chipset Motherboard
512MB PC-1066 RDRAM
200GB 7200RPM Ultra ATA100 Hard Drive 8MB Cache
► NEW! ATI® RADEON™ 9800 PRO 128MB DDR

High-Performance Heatsink/Cooling System
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Sound Blaster® Audigy 2™ 6.1 Sound Card
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10/100Mb Ethernet Controller
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► NEW! AlienIce: Video Cooling System
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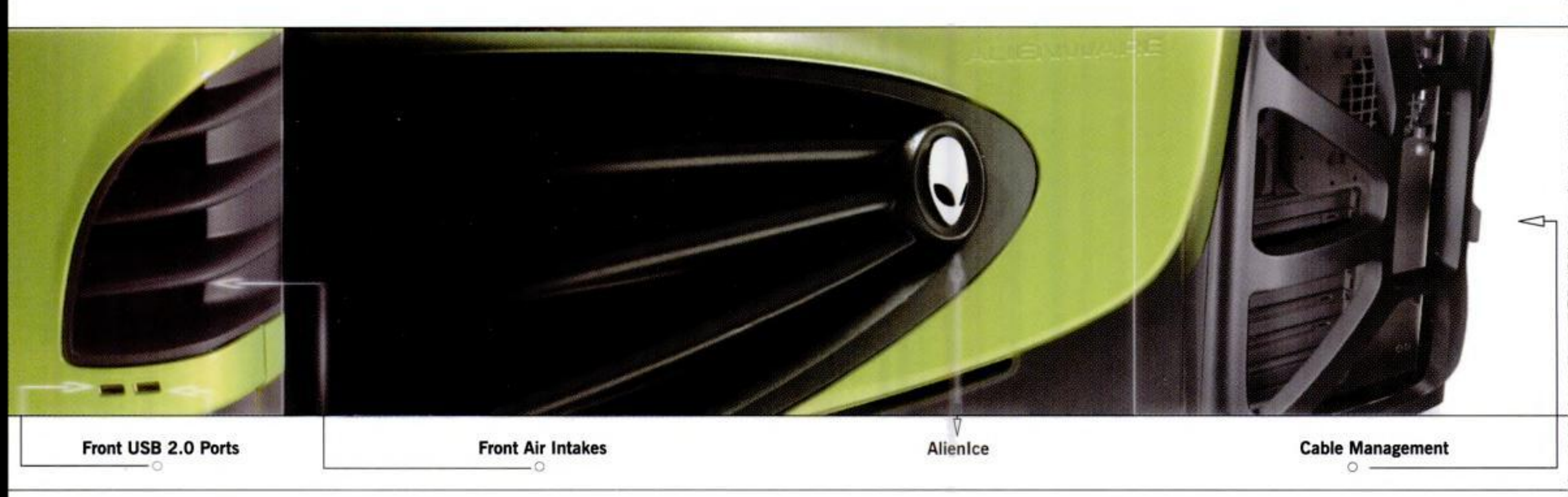
## NOW SHIPPING WITH THE ATi RADEON™ 9800 PRO

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Alienware® recommends Microsoft® Windows® XP.

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